

Springer International Handbooks of Education

Stephen Billett
Christian Harteis
Hans Gruber *Editors*

International Handbook of Research in Professional and Practice-based Learning

 Springer

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Stephen Billett • Christian Harteis • Hans Gruber
Editors

International Handbook of Research in Professional and Practice-based Learning

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Introduction

The need for both a thorough and robust initial preparation as well as provision supporting ongoing learning has become essential for the professions within the last decades. This is because the requirements for occupational practice continue to become more complex and demanding, and more frequently transform as labour markets have dramatically changed, and the requirements for practice continually change. Moreover, across western countries with advanced industrial economies, the key growth in employment can be found in occupations that are referred to as para-professional and professional occupations. Hence, there is a growing demand for both initial learning and ongoing development for professional occupations. In all, increases in demand for occupational development, transitions in individuals' occupational careers, and changing requirements for occupational activities and tasks make for both thorough initial preparation and ongoing learning throughout professionals' working lives essential now. Furthermore, as changes in these occupations' requirements for performance are usually manifested in particular set of everyday work tasks, both initial preparation and professional development provisions wholly located in educational institutions decrease in their salience. Correspondingly, learning and development experiences in and as part of professional activities has increased in their salience, and are often included within both initial and professional development programs. Consequently, educational provisions for the professions now focus increasingly on the analysis and the support of learning for, within and throughout professional lives, and often include practice-based experiences. It follows, therefore, that research on professional and practice-based learning is emerging as a crucial topic within educational enquiry, and one whose findings requires to be broadly considered, widely disseminated and acted upon in educational programs seeking to prepare individuals for professional occupations and then sustaining their employability across lengthening professional lives.

Associated with these educational goals are a range of scientific challenges and important focuses within the field of professional learning that warrant being further understood. These include understanding and making explicit the complex and massive knowledge that is required for professional practice and identifying ways in which this knowledge can best be initially learnt and developed further across

professional lives. For instance, conceptually, major issues for a handbook on research in professional and practice-based learning are analytical explications of those processes that support learning at an individual and an organisational level. Associated procedural issues include understanding how learning experiences and educational processes might best be aligned or integrated to support this professional learning, again at the individual workers' level as well as on organisational level of enterprises.

However, the increase in numbers and concentration of professional workers, and their need for ongoing development, demands a comprehensive handbook comprising contributions that speak directly to theoretical and empirical research on professional learning issues, and that can be considered as key reference for international scientific and educational community. Therefore, given these growing needs and sets of important educational challenges, it is only now necessary and timely to bring together what is currently known about professional work, processes for initial and ongoing development of the capacities required for effective professional practice and a specific consideration on practice-based learning in the form of a comprehensive handbook. This handbook aims to fill this gap, and, thereby, augment the existing Springer series (i.e. International Handbooks of Education). The intention with this handbook is to establish a strong research-based platform for informed discussion of the variety of concepts and practices associated with professional education and professionals' learning that focus on both the individual development of professionals and the organisation of professional life and educational experiences to support and sustain that learning, and with a particular emphasis on that learning arising through practice-based experiences. The key premise of this handbook is that during both initial and ongoing professional development, individual learning processes are influenced and shaped through their professional environment and practices. Moreover, in turn, the practice and processes of learning through practice are shaped by their development, all of which are required to be understood through a range of research orientations, methods and findings. All of this means this handbook necessarily engages a wide range of scholars whose research orientations, disciplines and perspectives are quite diverse. Contributions reporting research on the individual development in professional contexts are incorporated into the handbook as is research on the social embedding of practice in professional domains. The need to engage with this range of distinct contributions as well as being comprehensive required careful scoping and selection of contributors who are able to provide chapters that comprehensively inform the particular area or issue they address and which in turn have informed the development of the structure and organisation of the handbook's content.

Moreover, there are no restrictions in the area of relevant occupations or conceptual or procedural approaches to conform to those of the editors. Instead, an inclusive approach towards the project of research in professional learning is necessary and is adopted in selecting appropriate contributors and secure comprehensive and well-developed responses from them. In these ways, the handbook brings together the contributions of key international researchers across its two volumes of consolidated work. For this purpose, researchers from a range of disciplines make

contributions that are integrated into the text. The contributors include those from education, studies of the professions, anthropology, sociology, cognitive and social psychology, amongst others. Moreover, the book seeks to be inclusive in its scope. In this way, the handbook also aims at addressing professional learning in institutions of higher and vocational education as well as the practice settings where professionals work and learn, focussing on both initial and ongoing development. In all, the handbook provides a platform for between almost 50 contributions from selected and invited researchers in associated fields to present and discuss research highly focused and detailed analyses through their chapters.

The handbook comprises two volumes, with six sections each with distinct themes, three each per volume, with a total of 48 chapters. Each of these two volumes has an overarching purpose and the parts within them are directed towards describing, elaborating and articulating key aspects of that purpose. The contributors to this Handbook are drawn from across a range of countries and continents, languages, disciplines and fields of study. These volumes and the contributing sectors are now briefly introduced.

Volume 1 – Scientific and Institutional Framework

The first volume sets out the scientific institutional framework through which professions can be understood, their purposes identified and investigated, the kinds of practices that are organised and enacted to develop the capacities required to practice them. Central to these practices are the provision of practice-based experiences which are central to developing the kinds of capacities required for effective professional practice. The three parts comprising this volume are entitled: (i) Professions and professional practice; (ii) Research paradigms; and (iii) Educational institutions and systems. The focuses for those parts are briefly outlined below.

Professions and professional practice: This part comprises contributions that advance accounts of what constitutes the professions, professional practice and how the practice of professions is enacted in the workplace. These contributions explicitly address what constitutes professions and professional practice, including its ethical dimensions. Considerations are also given here to the formation of professions and the way professional associations and professionals serve and sustain the standing of the professions. In doing so, this part sets out something of the concepts, thematic issues and premises for considering what constitutes the professions and their formation.

Research paradigms: This part comprises contributions outlining the diverse theoretical and conceptual accounts of understanding both professions and professional learning, and that indicate the scope of methodological approaches to investigating both the professions and professional learning. These approaches are represented by accounts of methods and paradigms which are used to engage in scientific enquiry associated with what constitutes professional work and its learning. Key and contrasting methods are included, illustrated and discussed in this part.

Educational institutions and systems: This part comprises contributions identifying the educational purposes and processes (i.e. curriculum and pedagogy) used by educational institutions to prepare professionals and then maintain their competence across their working lives. Featured here are selected accounts of the way educational systems have been organised and enacted to secure professional learning outcomes and what kinds of conceptions of curriculum and curriculum practices are utilised in securing effective professional capacities through educational institutions and systems.

Volume 2 – Learning, Education and Assessment in and for the Professions

This second volume focuses on procedural issues associated with learning for and through professional practice. This includes a necessary but central consideration of the role which practice-based learning experiences play in the formation of national capacities. Moreover, attention is given to the design and implementation of experiences that support professional learning both through initial preparation and ongoing development across professional lives. Concluding here is also a set of considerations about the assessment of learning experiences and the evaluation of professional education provisions. The three parts comprising this volume are entitled: (i) Practice-based learning activities; (ii) Implementing and supporting professional learning; and (iii) Assessing professional learning.

Practice-based learning activities: This part comprises reviews and analyses of the current state of research on work related learning activities occurring outside educational institutions – e.g. workplaces, everyday life, private environments – covering intentional as well as incidental learning. Central to this part is understanding, illustrating and elaborating the roles which practice-based learning activities play in the development of occupational identity and capacities as well as being utilised as sites for ongoing professional learning across lengthening working lives. Included here are contributions that utilise the educational lexicon and discourse to understand, legitimate and illustrate the ways which practice-based activities and experiences are central to professional formation.

Implementing and supporting professional learning: This part comprises research reporting on processes of and practices for the ongoing development of professional competence, with a particular emphasis on how this kind of learning arises through practice-based strategies. The strategies comprise a range of curriculum and pedagogies practices which can be used to secure professional capacities and identities. These include considerations of the goals and purposes for professional education and further development, and the way in which practices such as mentoring, the use of teams and the actions of professionals themselves are central to securing initial and ongoing professional competence.

Assessing professional learning: This part addresses research on issues of judging, evaluating, monitoring, and assessing professional learning. The chapters address evaluation processes on the micro-, meso-, and macro level of analysis by exploring methodological and normative issues of work related judgement processes. Research which reports the ways in which professional learning can be assessed and the means by which the assessment progresses feature within this final part. This featuring largely focuses on making judgements about what constitutes professional competence, means for validly and reliably assessing that learning, and extends through to considerations and practices associated with the evaluation of education programs, provisions of educational institutions and other kinds of experiences that seek to secure, certify and order professional knowledge.

Through the focus of these volumes and the structuring of these contributions, what is provided within this International Handbook of Research into professional and Practice Based Learning is an attempt to provide a comprehensive, albeit not exhaustive, resource which provides an informed account of the field which builds upon a scientific and institutional heritage and seeks to use that heritage to inform how provisions for the initial and ongoing learning professionals can be ordered, enacted, supported and assessed.

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December 2013

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Part I

Professions and Professional Practice

This first part comprises contributions that advance accounts of what constitutes the professions, professional practice and how the practice of professions is enacted in workplaces. In doing so, they set out and elaborate the objects of what efforts associated with learning for the professions and through practice-based considerations are directed. In his chapter – *Professionalism, profession and professional conduct: Towards a basic logic and ethical geography* (Chap. 1) – David Carr explores the current broadly based interest in professions and professionalism. Both the attraction of high status occupations and characteristics of occupations performed to the highest standard, including ethical conduct have broadly attracted much interest. Yet, such premises require clear understandings about and distinctions amongst what constitutes a profession, being professional and the broader conservation of professionalism. He proposes that whilst many occupations have and are characterised by the need for moral conduct, that professions are distinguishable by inherent ethical nature and the status of their enactment. These distinguishing qualities then become central concern for professional education, with the object of securing a professional phronesis. Adopting a sociological stance Julia Evetts in her chapter – *The concept of professionalism: Professional work, professional practice and learning* (Chap. 2) – elaborates changing conceptions of professionalism from those largely associated with the organisation of work practice as undertaken and exercised by an individual professional, through to a form of work which is increasingly subject to the constraints and expectations of large organisations, where professionals increasingly work. To delineate this trajectory, she examines how the conception of professionalism arose and has been transformed in contemporary times. In particular, she refers to how the practice of the professions within organisations whilst being increasingly common, positions professionalism and professionals discretion in decision-making within an organisational context, which could have either private or public sector goals. Adopting a similar theme, Gerhard Minnameier proposes that the sets of standards which are used to guide the preparation of professionals needs to both include the moral aspects of professional practice, and how those aspects and professional practice more broadly are shaped by situational clues and

what constitutes situationally appropriate professional practice. In his aptly entitled contribution – *Moral aspects of professions and professional practice* (Chap. 3) – he argues for the use of a broader set of standards as guidelines for developing professional practice and that these guidelines need to address both moral and situational adjustments to more broadly encompass that practice.

In their chapter – *Professional work and knowledge* (Chap. 4) – Peter Goodyear and Lina Markauskaite explore perspectives of relations between professional work and the knowledge which supports it. Their review is informed by emerging theories that make specific references to both contributions from working and learning in work settings which are captured through the conception of an extended mind. This consideration is augmented by accounts and conceptions that emphasise the active nature of perception as possessed and deployed by human actors. They suggest that the reliance upon explicit and conceptual knowledge as emphasised within the educational discourse needs to be moderated by one which is more broadly inclusive of a wider range of ways of knowing, acting and the circumstances in which these can be more effectively enacted. For instance, the emphasis on experiences within work settings and how these might be related to those within educational institutions is a central consideration. In his chapter – *Conceptions of professional competence* (Chap. 5) – Martin Mulder proposes that conceptions of professional competence have been helpful in understanding the requirements for learning these occupations and through practice-based experiences. His emphases in making such claims is that through coming to understand what constitutes professional competence and that what constitutes professional competence has a range of dimensions and characteristics which then can lead to informed views about how such competence can be developed initially and extended across professionals' working life. In advancing the case he links competence to considerations of motivation, intelligence as well as performance. From these, a number of specific and non-domain specific elements of competence are proposed as needing to be developed. He then proposes schemes by which professional competence can be generated and evaluated, and provides examples of how this has been enacted across a range of occupations.

Adopting a sociological perspective, Silvia Gherardi and Manuela Perrotta in their chapter – *Becoming a practitioner: Professional learning as a social practice* (Chap. 6) – discuss another kind of trajectory. That is, of individuals becoming socialised as professional practitioners, through their participation in professional practice, and socialisation into the particular profession. They identify a dual process of individuals being inducted into a particular circumstance of practice and at the same time being seduced into the particular profession. Hence, they give much attention to the issue of being inducted into professional practice and professional work. Basing their analyses on professionals' engagement in fertility clinics, they propose processes of becoming a professional is not concluded when commencing as a professional, but continues across working life as does the tensions in negotiations of contradictions amongst the management of professional work, its conduct and professionals' identity as workers. Finally, in the chapter entitled – *Productive systems of professional formation* (Chap. 7) – Jim Hordern examines ways that pathways towards and processes of professional formation recognition are shaped

by the relations amongst professional associations, educational institutions and employing organisations. These relations give rise to not only to what constitutes professional knowledge, but also the organisation of professional work. Adopting a sociological perspective of knowledge and identity formation, and drawing findings from distinct kinds of professional practice, this chapter illuminates how these processes are enacted and appropriated by those engaged in professional work.

Across this opening part, then, these contributions explicitly address what constitutes professions and professional practice, including the ethical dimensions of occupational practice. Considerations are also given here to the formation of professions and the way professional associations and professionals serve and sustain the standing of the professions. In doing so, these contributions set out something of the concepts, thematic issues and premises for considering what constitutes the professions and their formation that are the central focus of this Handbook.

Chapter 1

Professionalism, Profession and Professional Conduct: Towards a Basic Logical and Ethical Geography

David Carr

Abstract For various reasons, concepts of profession, professionalism and professional conduct are of considerable political interest and concern, especially in modern liberal democratic contexts and economies. For one thing, the idea of profession has become the modern gold standard of occupational status: for another, insofar as ideas of profession or professionalism have been associated with notions of enhanced occupational standards, to regard workplace conduct as ‘professional’ is to consider it to have been performed according to the highest moral and technical standards. That said, it seems that such notions are liable to unhelpful confusions between different and distinguishable senses of such terms as ‘profession’, ‘professional’ and ‘professionalism’. From this viewpoint, the first aim of this chapter to distinguish and clarify different senses of professionalism and profession – in particular, to distinguish ‘profession’ as a term for a particular type or category of human occupation from a broader notion of ‘professional’ as a more general term of normative appraisal. Following this, however, the chapter turns to deeper exploration of profession, arguing that while other occupations can and often are conducted morally, what mainly distinguishes professions from other occupations is their inherently ethical nature and status. Further to this, the chapter also aspires to give a distinctively ‘virtue ethical’ account of such status focused on the development of ‘professional phronesis’.

Keywords Professionalism • Professional • Profession • Ethics • Moral virtue • *Phronesis* • Practical wisdom

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1.1 Diverse Senses of ‘Profession’ and ‘Professional’

Concepts of profession, professionalism and professional conduct are of considerable public interest and concern, especially in modern liberal democratic contexts and economies. For the moment, we may mention two broad reasons for such interest. First, the idea of profession – or the aspiration to ‘professional’ recognition – has become the modern gold standard of occupational status: occupations already widely regarded as professions guard such status with jealous pride, and those presently lacking such recognition aspire no less enviously to such status. Secondly, however, ideas of profession or professionalism have usually implied or been associated with enhanced occupational standards – so that, as we shall see, to describe an episode of workplace conduct as ‘professional’ is usually to regard it as having been performed to the very highest moral and technical standards. That said, to whatever extent at least the aspiration to such standards may capture part of what we commonly mean by such terms as ‘profession’ ‘professional’ and ‘professionalism’ these also seem to be caught in a web of confusions between rather different ideas or concepts that it is part of our present purpose to untangle (For some history of social development of notions of profession and professionalism, see Larson 1977: for previous treatments by the present author of the conceptual issues, see Carr 1999, 2000).

In what follows, I will assume that most modern non-English counterparts of such terms as ‘profession’, ‘professional’ and ‘professionalism’ – given the relatively recent global currency of such terms – reflect or exhibit much the same nuances and associations that they have in common or standard Anglophone usage. At all events, it should first be clear that such terms are used in a range of different ways – not all of which are entirely consistent with one another. In this regard, perhaps the loosest usage concerns the term ‘professional’ as such. Indeed, grammatically speaking, we might first note that while this term is often – perhaps mainly or primarily – used adjectivally, it is nowadays also much employed as a *noun*. Thus, to refer to someone as ‘a professional’ may be to signify that he or she belongs to one (or more) of a certain class or category of human occupations – commonly called ‘professions’ – or, more modestly, that he or she (doctor, teacher, plumber, office cleaner or whatever) is a person who has actually some training, expertise or experience with regard to the task (s)he is performing. Clearly, however, someone may be considered a professional in the second of these senses without being, or being considered to be, a professional in the first. Moreover, while any converse mismatch is less likely – since one might hope for or trust in some degree of relevant training or experience on the part of general practitioners or lawyers – one might still intelligibly observe of some professional practitioner, on some occasion, that although (s)he was a professional in the first sense (s)he was not much of one in the second.

That said, the term ‘professional’ seems no less prone to ambiguity in its perhaps more familiar adjectival sense. To begin with, there is a familiar enough sense of ‘professional’ indicating little more than that those engaged in this or that

occupation receive payment for what they do. In this sense, in referring to someone as a professional footballer (for example), the implied contrast is with all those who are (unpaid) amateurs. (We shall not here pause to consider more recent blurring of this distinction as the in notion of the professional amateur or ‘pro-am’: but see Leadbeater and Miller 2004.) However, this is clearly a different sense of ‘professional’ from that whereby we commend someone for a job well done. Thus, if a plumber comes to my house and makes an expert job of installing the washing machine, I may recommend his or her services to my neighbour as highly professional; whereas if the builder makes a terrible mess of repairing the garage, I am likely to dismiss him (or her) as ‘unprofessional’. In this sense, the terms ‘professional’ and ‘unprofessional’ are just very general terms of normative appraisal: as such, they are used to signify whether or not a provider of this or that service has performed it to competent or exemplary standards. But given that the sense of professional as contrasted with ‘unprofessional’ is *different* from that which contrasts with ‘amateur’, there can be no contradiction in stating that an agent who performs professionally in one sense does not do so in another. Thus, we may – without the least whiff of self-contradiction or paradox – judge that this professional footballer has played unprofessionally, whereas the playing of that amateur is extremely professional. To complicate things yet further, however, while we have already noted a common contemporary use of ‘professional’ to refer to members of professions, it should be clear that we might consider paid workers who give satisfactory service to be professional in these senses without regarding them as member of *professions*.

In this light, to speak of agents as professionals in the sense of members of professions is to place them in a particular occupational category that has traditionally included doctors, lawyers and architects, but excluded joiners, plumbers and electricians. To be sure, the question of which occupations should be included in the general category of profession is a matter of some dispute. Indeed, it seems nowadays widely held – under the influence of modern ‘constructivist’ social theory that there is little more to any distinctions between so-called professions and other occupations than considerations of social standing and no grounds other than status mongering and snobbery for regarding general medical practice and law as professions and refusing so to recognise teachers, nurses or electricians. That said, it hardly does much to explain the different social status of diverse occupations, to say that it is because people or societies have come to regard them in this way. Thus, without denying that status mongering and snobbery are, or have often been, involved in claims to professional membership, it should be admitted that there *are* significant economic and other differences between human occupations that are not just differences of social regard – so that the more interesting question might be that of why, in the light of such differences, occupations have attracted different social status. Indeed, it is of some interest here that despite latter day aspirations of such groups as ministers, teachers and nurses to the status of profession, these occupations have traditionally merited much social esteem as ‘vocations’ rather than professions. (For a thought-provoking critique of the present author’s position, which – despite some misunderstanding – gives broader occupational and vocational application to

present points, see Winch 2002.) At all events, we shall now examine the question of what, if anything, *might* distinguish the occupational category of profession from such other groupings as (for example) vocation, trade or service industry.

1.2 Criteria of ‘Profession’ and/or Professionalism

Much latter day (particularly sociological) literature on professions and professionalism has sought to ‘define’ such notions – or, at any rate, to specify criteria for the correct application of the terms in question. In the event, many such attempts seem to have been bedevilled by aforementioned confusions between notions of profession and professional – since (for one thing) alleged criteria of ‘professionalism’ have usually looked more like criteria for professional membership. Indeed, perhaps compounding such confusion, it has been common to refer to occupations such as nursing, teaching and ministry as ‘semi-professions’ (see, primarily, Etzioni 1969) largely on the grounds that they do not meet all suggested criteria of full professionalism – some of which would only strictly apply, as it were, to traditional professions. Still, such confusion aside, we may take the most frequently cited criteria of profession or professionalism as useful starting points for exploration of the contours of both profession and the normative character of much professional service. While such lists of criteria vary somewhat between sources, the following conditions of profession/professionalism are routinely specified (see, for example, Humes 1986): (i) that the occupation in question provides important or valued public service; (ii) that it requires substantial knowledge and skill involving extensive education and/or training; (iii) that it embodies something like a moral or ethical code spelling out the nature of professional duties; (iv) that its workers have appropriate scope for the exercise of independent (‘autonomous’) thought and judgement in complex circumstances; (v) that it is organised on a self-regulating basis for purposes of recruitment and discipline. In the rest of this chapter, we shall submit the more fundamental (mainly the first four) of these conditions to closer examination.

The trouble with the first, ‘important professional service’, criterion is that it seems far too vague or imprecise for any useful purpose. First, as previously noted, since what may count as an important service must depend somewhat on an agent’s needs at this or that particular moment, almost any human occupation is likely to be of pressing importance at some time or another: if I am up to my eyes in water in the kitchen or my rubbish has not been collected for the past month, I am likely to regard the services of plumbers or garbage collectors as more urgent than those of lawyers or GPs. That said, it seems possible to put a rather finer point on this idea as at least contributory to the definition of such established professions a medicine and law. For example, one point that might be made about medical and legal services is that they are concerned to address needs – in such cases for health care and civil liberty – that are quite basic to human flourishing in any tolerable human society. Indeed, such needs are so basic to human welfare or benefit – in anything that we should want to call a civil society – that some institutional provision for such needs tends to be

regarded as something like a *moral* right or entitlement. Thus, while it might sound odd to speak of someone having a right to a new car, a smart suit of clothes or a good bottle of wine, it may seem more apt to speak of someone as having a right to (at least basic) medical treatment or legal aid. That said, many other human occupations such as teaching, nursing and ministry – not always included in traditional lists of professions – might well be regarded as fulfilling this condition of profession.

In particular, it might be said that education in the form of institutionalised schooling seeks – along with medicine and law – to provide a necessary condition of flourishing or survival in the complex circumstances of modern civil societies. For just as citizens are unlikely to fare well in the absence of those civil liberties that a legal system is (at least in principle) designed to uphold or defend, or in the absence of the basic health-care that institutionalised medical care exists to provide, so individuals are unlikely to prosper in technologically advanced modern societies without the basic knowledge and expertise – literacy, numeracy and employable skills – that state schooling aims to promote. From this viewpoint, education (or at least institutionalised schooling), along with law and medicine, might be regarded as providing a basic triple bulwark against perennial human evils of disease, injustice and ignorance. That said, something along these lines (if with slightly less clout) might also be said on behalf of services that other human occupations aim to provide. For, to be sure, it also makes much sense to speak of civil rights or entitlements to some (basic) affordable housing, clean water, energy supply, postal delivery, public transport, refuse collection – as distinct from private transport, free holidays or local entertainment – and so on (again, see Winch 2002). All the same, as we shall shortly see, some such moral discourse of rights, obligations and/or (corresponding) public accountability would seem to be significantly implicated in any significant definition of profession or professional service.

Moreover, the important public service criterion is only proposed as *one* feature of profession or professionalism – as a *necessary* rather than sufficient condition – and as such needs to be reinforced by other aforementioned criteria. So what, then, of the second criterion of substantial knowledge and skill involving extended education and training? Again, this requirement is rather vague as it stands, and – without some further specification – might well apply to many occupations that would not widely be considered professions. Still, perhaps the key point at issue here is that not any kind of knowledge, or any sort of education – such as the extensive craft knowledge acquired through even lengthy apprenticeship to a trade – would qualify in this regard. The expertise in question here would seem to be precisely academic or research-based knowledge and understanding normally acquired through graduate and/or postgraduate study. (However, for some interesting questions about the role and status of professional ‘experts’ and ‘expertise’ in the face of information technology and contemporary ‘knowledge society’, see Weinberger 2011.) From this viewpoint, the kinds of formal academic education associated with such acknowledged professions as law and medicine would best exemplify the epistemic criterion of profession/professionalism. However, this does fairly sharply separate the professional sheep from the non-professional goats for many if not most human occupations, since the practical hands-on knowledge acquired over the course of

even lengthy apprenticeship would not serve to raise such trades as plumbing or joinery to the status of profession – although, of course, we might still regard certain forms of practical or technical failure or dereliction as ‘unprofessional’ in the wider normative sense of this term.

That said, the professional knowledge condition does raise problems for certain occupations that have gained some contemporary credibility as professions – partly by dint of extensive or recently extended professional training and preparation. Indeed, one such ‘problematic’ occupation is *teaching*. To be sure, one general difficulty about evaluating the professional status of teaching is that there are different sectors of teaching that require different levels or depths of expertise. It is clear, for example, that lecturers in universities or other institutions of higher education, as well as many subject specialists in secondary schooling, will usually have undergone extensive in-depth education and training in this or that field of knowledge and understanding in order to qualify for university, college or secondary teaching. Most contemporary secondary school teachers, as well as some university or college lecturers, will also have acquired some kind of training in professional conduct or technique via postgraduate diplomas of education (UK PGDE’s) or other vocational qualifications. But for legions of teachers working in early or primary education the situation is often different. Indeed, in the United Kingdom and elsewhere, the history of elementary teacher training is largely a tale of fairly rudimentary initiation – often via little more than apprenticeship – into basic instructional methods, for which little in the way of advanced personal education would be required. For well into post-WWII years, the academic fare of teacher training colleges was little more than a rag-bag of loosely connected scraps of educational history, ‘philosophy’ and psychological theory, and it was not until the late 1960s that a serious attempt was made to make degree level purses out of the sows’ ears of pre-service teacher training courses. (For the development of British teacher education, see Dent 1977; and Thomas 1990).

Moreover, despite much professional effort during the early decades of post WWII settlement towards transforming elementary teaching into an all-graduate profession in Britain and elsewhere, political and professional doubts have continued to surface about whether lengthy academic training – particularly in the academically suspect realms of so-called educational theory – is the best route to producing teachers, and there have been regular calls to return to something more like school-based training of teachers in classroom skills or ‘competences’. The basic idea here is that beyond the possession of adequate subject knowledge – which, for primary teachers, would really mean no more than the general knowledge acquired during compulsory primary and secondary schooling – all there really is to good teaching is the mastery of a repertoire of effective techniques of classroom management and communication. From this viewpoint, what has been derided as ‘barmy’ educational theory (Clarke 1991) – usually a rather uncertain mixture of psychology, sociology, philosophy and history of education – has been dismissed as not only redundant, but actually impedimental to the efficient promotion of effective school learning. Indeed, calls by British political and educational conservatives to abolish both educational theory and the training institutions in which it is taught have

been fuelled by various events in which the college teaching of educational studies, influenced by radical (Marxist, anarchist and other) social theory, has allegedly undermined school order and discipline and created local social unrest and division (see Davis 2002 on the infamous British ‘William Tyndale’ affair). There can also be little doubt that the Dewey influenced progressivism of the professional education academy of the USA has been viewed with similar scepticism and distrust by American political and educational conservatives.

In short, given the enormous public significance of schooling as a formative influence on the character and attitudes of citizens, it is hardly surprising that any and all untoward social developments in which such schooling may seem to have been implicated have been of larger political concern: that, indeed, such events have usually inclined to tighter central control over the pre-service training of teachers and the conduct of public education. Indeed, it is now a part of the received professional wisdom of British teacher educators that recent tighter central control over both the content and methods of state schooling has followed directly from political and public perceptions of declining standards in primary schools – widely imputed to the so-called ‘progressive’ educational innovations of the 1960s and the influence of radical (usually neo-Marxist) social theory on the college training of teachers in the 1960s and 1970s. Subsequent state educational ‘reforms’ have taken the forms: first, of direct central control of the school curriculum through the imposition of national curricula – determining *what* teachers are allowed to teach; secondarily, of the imposition of various ‘competence’ and other models of teacher training – prescribing fairly precisely *how* teachers should teach (see Carr 2000; Hyland 1993). While such developments were invariably promoted in the name of enhanced or improved teacher ‘professionalism’, they have been widely perceived by teachers and teacher educators as ‘de-professionalizing’: on this view, such initiatives significantly restrict teachers’ individual autonomy and initiative, reducing them to ‘classroom technicians’ whose main role is to follow the directives of various line-managers. At this point, indeed, we may note that such scepticism about whether teaching satisfies the ‘epistemic’ criterion of professionalism (or of teaching profession) – more particularly, about whether there is any theoretically significant professional knowledge or expertise that teachers might be said to possess – have precisely fuelled doubts about the fourth criterion of professionalism as applied to teaching (or, again, about the status of teaching as a profession): that teaching might be considered the kind of occupation that requires, or allows much scope for, individual judgement or *autonomy*.

1.3 The Moral Basis of Profession and Normative Professionalism

At this point, however, perhaps the precise implications of the epistemic or knowledge condition of profession or professionalism would benefit from closer scrutiny. For the assumption so far seems to be that the status of an occupation as a profession or

as professional depends primarily on extent of the in-depth theoretical or (in some cases) technical knowledge that it requires of practitioners. In this light, a medical consultant or surgeon will count as highly professional insofar as (s)he possesses cutting-edge knowledge of the latest developments in medicine, and university teaching would count as more of a profession – or as more professional – than infant teaching just to the extent that it requires an academically deeper level of subject knowledge. On this view, teaching becomes more professional, or more of a profession, the more specialised the knowledge that it transmits becomes, and as the age of the students to whom that knowledge is instructed increases – so that tutoring adults would have to count as more of a profession or more professional than teaching (or nurturing) children in the nursery classroom. But although teachers themselves may often have been guilty of viewing the matter in this light, there would seem to be something objectionable about any such viewpoint. For even though the kind of knowledge generally associated with professions may be of a highly sophisticated academic or technical nature, and while some professional shortcomings may well relate to deficiencies of academic and technical knowledge, such deficiencies are not obviously the only or the most significant grounds on which we might judge this or that practice to be *unprofessional*. Indeed, it may be that we would not necessarily fault a doctor or a lawyer for lacking some item of academic knowledge or some skill as such, unless such lack directly undermined this or that obligation of justice or care towards patient or client: on the other hand, we may readily impute professional failures to teachers of early years even though such teachers would not be expected to profess high levels of academic or technical skill. In short, those knowledge-related deficiencies for which practitioners are likely to be judged unprofessional seem to turn more on failures to appreciate what is required for appropriate association or transaction with those they are employed to serve.

To be sure, in the broad normative sense that entails failure to rise to the highest standards of any given occupation, charges of unprofessionalism – notably in the case of such trades and crafts as building, joinery and plumbing – are more likely to turn on lack of knowledge of the principles of building, joinery or plumbing, or of the trade skills required for building or plumbing, than on considerations related more to the complexities of human relationship or association. In crude terms, we are more likely to regard a builder as unprofessional on the grounds that he lacks knowledge of how the roof is constructed, or the skills to repair it, than because he fails to respect confidences, charges some more than others for the same job, is rude or offhand to clients, or (even) sleeps with their wives. A builder may be guilty all of these offences and yet pass muster as a professionally commendable – in the general occupational requirement sense of ‘professional’ – artisan. Of course, we may prefer to employ trades-people who do not behave in such humanly disreputable ways; it may well be bad business (given the ill repute they are likely to acquire) for them so to conduct themselves; and it is clear enough that many trades-people are of highly praiseworthy character and conduct. The present point is only that it is mainly by their craft knowledge and skills that we judge such trades-people to be professional or unprofessional. Many who are highly professional in the ‘job-well-done’ sense are notorious for poor time-keeping, avoiding clients they

find uncongenial or giving variable estimates (perhaps on the basis of on-the-spot judgements about what this or that client seems able to afford). But we are less liable on these accounts to question their professional competence. Still, ironically, it may be just on such grounds that people have traditionally been *disinclined* to include building, plumbing and other trades in the 'higher' occupational category of 'profession'.

From this viewpoint, it begins to look as though the kind of knowledge, expertise or wisdom on which the professionalism of professions mainly turns could not be academic or technical knowledge quite divorced from other human capacities. While we do expect members of professions – taking these, for the moment, to include such 'white collar' occupations as medicine, law, teaching, ministry and architecture – to be well-educated people, it is not upon such academic learning *per se* that their professional status depends, but upon their capacity to engage – albeit in the light of such learning – in civilised and/or morally principled association: indeed, despite a common assumption that members of professions must possess highly specialist knowledge of particular fields of academic study or enquiry, this may not always be so (in the case of, say, generalist primary teachers). So, what might we expect of good ('professional') doctors is that they are able to judge what is the right course of treatment in these circumstances for this particular (anxiety-prone) patient; of good lawyers that they are able to distance themselves, in the interests of just and impartial treatment, from personal sympathies or antipathies towards those they are required to prosecute or defend; and of good teachers that they are able to instil character-forming discipline, or provide necessary support to under-confident or vulnerable pupils, as and when circumstances indicate the need for this. In short, it is not the possession of bodies of academic knowledge or of sophisticated technical skill *as such* that members of professions need for professional conduct: what is rather required is the *education* – displayed, amongst other things, in a grasp of principles of just and equitable human association and in qualities of reflective character – to appreciate how such occupational knowledge and technique might or should be utilised for individual or common good.

Since it ought already to be evident that such appreciation is deeply implicated in considerations of fairness, equal regard and right action, it should now be clear that our exploration of the nature of profession and (higher) professionalism has taken a distinctively *moral* turn – and that it is now time to look more closely at the third 'moral' criterion of profession. (For a useful overview of the ethics of profession and professionalism, see Koehn 1994.) In this light, we have already noted that such professional services as health care, legal aid and education are naturally spoken of as benefits to which people have *rights*. To be sure, rights talk is not exclusive to professional services or always even significantly moral: thus, if I purchase a faulty television set, such purchase will usually carry a supplier's guarantee of my right to return the item – and to a refund of my money – if the item is faulty. But, first, such rights – and any derivative obligations – are evidently not *universally* applicable – since they are clearly relative to the terms of this or that specific contract. Moreover, though we may say that a company that refuses refund for faulty goods or services is culpable or unfair, such unfairness may appear only

minimally or restrictedly moral – or, perhaps, to be more a legal than a moral matter. On the other hand, for some moral theorists – such as, notably, Kant (1967) – the two ideas of morality and universality have been inseparably linked. On this view, a moral right is one that is owed to all by virtue of a common human (rational) condition – rather than as a matter of local commercial or other contract – and a moral duty is one that all human agents owe to others by that same token of common (rational) humanity. Kant’s various formulations of the *categorical* (or moral) imperative, specify that a moral (as opposed to prudential) law or prescription is ‘universalizable’ – in other words, one to which we might will the obedience of all without exception – as well as one that advocates treatment of any and all human agents as ends in themselves rather than as means to this or that particular end.

Interestingly, it seems to be much the spirit of this Kantian account of morality that lies at the heart of the most enduring – and certainly the earliest – western conception of professional ethics. This conception, ascribed to the fourth century BC Greek physician Hippocrates, insists that the human needs which those of his profession are called upon to meet are so basic and common (perhaps, more strongly, universal) as to place doctors under a clear moral obligation to address them. This means, amongst other things, that doctors should always put the interests of patients above their own and never exploit them for their own advantage or profit. In its original formulation, the Hippocratic code runs as follows:

I swear by Apollo Physician and Asclepius and Hygieia and Panacea and all the gods and goddesses, making them my witnesses, that I will fulfil according to my ability and judgment this oath and this covenant:

To hold him who has taught me this art as equal to my parents and to live my life in partnership with him, and if he is in need of money to give him a share of mine, and to regard his offspring as equal to my brothers in male lineage and to teach them this art – if they desire to learn it – without fee and covenant; to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but no one else.

I will apply dietetic measures for the benefit of the sick according to my ability and judgment; I will keep them from harm and injustice.

I will neither give a deadly drug to anybody who asked for it, nor will I make a suggestion to this effect. Similarly I will not give to a woman an abortive remedy. In purity and holiness I will guard my life and my art.

I will not use the knife, not even on sufferers from stone, but will withdraw in favour of such men as are engaged in this work.

Whatever houses I may visit, I will come for the benefit of the sick, remaining free of all intentional injustice, of all mischief and in particular of sexual relations with both female and male persons, be they free or slaves.

What I may see or hear in the course of the treatment or even outside of the treatment in regard to the life of men, which on no account one must spread abroad, I will keep to myself, holding such things shameful to be spoken about.

If I fulfil this oath and do not violate it, may it be granted to me to enjoy life and art, being honoured with fame among all men for all time to come; if I transgress it and swear falsely, may the opposite of all this be my lot (Edelstein 1943).

The spirit of this code has governed western medical ethics down to the present day and survives in modern dress as the ‘Hippocratic oath’ that doctors are required

to swear (in an appropriately updated version) as rite of professional passage. Mirroring precisely Kant's general account of moral agency as obedience to duty, the Hippocratic oath conceives medical ethics in terms of a universal or absolute obligation to meet the health needs of patients wherever and whenever possible, requiring doctors to treat patients always as ends and never as means to personal interest or advantage. The 'Kantian' heart of this ethics of professional duty – the core of its universalizability – lies in the allegedly 'reciprocal' character of moral rules. Kant's idea – anticipated by Rousseau (1973) and followed in modern times by quasi-Kantian contractarian moral and social theorists (such as Rawls 1999) – is that some human needs (for care, respect, freedom and so on) are so common and basic that no rational agent could do other than wish to have these guaranteed as a matter of *right*. However, the only way in which such needs might be effectively secured as rights, is if *all* rational agents see themselves as bound by duty to respect the claims to these self-same rights of others. For Kant, there is blatant irrationality in failing to feel so bound. If, for example, I claim freedom from slavery as a human *right*, I cannot rationally avoid a corresponding duty to respect the right of the next person to that same freedom: in short, slave owners seem caught in downright incoherence and contradiction if they claim personal freedom as a right, yet deny this to others. By the same token, the Hippocratic claim is that in respect of the common human needs for relief from the suffering and injury of disease that it is the business of physicians to address, no professionally reputable doctor could wish other than that all those in his or her position should feel *duty bound* to meet such needs whenever possible.

Insofar, it would appear that the primal obligation of professions to address common and basic human needs – regardless of any (professionally irrelevant) individual differences of those in need – generally tends towards a *deontological* (perhaps primarily Kantian) account of professional ethics: on this view, a moral duty to equal treatment of clients or patients is written into the very idea of good professional practice. More pointedly, the Hippocratic code requires doctors to address the needs of patients in a spirit of disinterested *impartiality* – without, as it were, fear or favour: generally, professional practitioners should eschew bias or prejudice, avoiding preference of this client over that one on grounds of wealth, race, colour, class or gender. That said, such impartiality – as the very hallmark of professionalism – has often been equated with *impersonality*: as, precisely, precluding any and all personal relations between professional practitioners and clients. In this light, good doctors, lawyers, architects, teachers or ministers are required to avoid all contact or involvement with clients, patients or pupils that might suggest that one person has been preferred over another for this or that personal motive. But this may also appear somewhat counterintuitive. To begin with, it might be asked, is it really the case that I can only be – professionally or otherwise – just or fair to others by treating them alike? Indeed, on the level of everyday personal association, it would seem fairly obvious that I may *not* be acting fairly or justly towards my two daughters in buying them the same book for their birthdays if one is interested in the topic of the book and the other has no interest in it whatsoever. In this case, it might be said either: (1) that I cared for the one (who appreciated the book) more than the

other; or (2) that I cared for neither (if, say, I did not care whether either valued the book) in a spirit of complete indifference to the needs or interests of either. In general appreciation of this point, Aristotle (1941a) famously argued that it is no less unjust to treat unequals equally than it is to treat equals unequally.

All the same, does not the deontological construal of professional ethics precisely aim to distinguish the kind of non-professional relations I might have with my own children from the professional relations I *should* have with those of other people? But there seem to be at least two problems with any such broad distinction. The first of these is to hold, *contra* Aristotle, that the *only* kind or level of justice in any human affairs *is* that involved treating equals equally – in that sense of impartiality that implies avoidance of bias or prejudice, fear or favour. However, the second is precisely to make the fairly common mistake of supposing – as in the previous paragraph – that impartiality logically entails *impersonality*, understood as avoiding any and all personal human association. Avoiding these errors, we may recognise that although we should want doctors, lawyers, nurses and teachers who are not biased towards or against patients, clients or pupils on grounds of race, class, religion, intellectual ability or physical disability – or who are not actually inclined to personal favouritism – this need not preclude personal relations of a more professionally positive or constructive kind. Indeed, it should be clear that good practitioners are precisely those capable of entering into professionally *appropriate* personal relations with clients, patients or pupils. Thus, we might expect a good teacher to be the one who is sensitive to the different emotional characters of pupils that may incline them to react differently to different types of motivation; or a good doctor to be one who is similarly able to distinguish sensitively between the emotional vulnerability of this patient and the more stoical or ‘no-nonsense’ attitude of that one.

So while professional conduct may need to be understood or defined at least partly in deontological terms – as a matter of disregarding professionally irrelevant individual differences – this cannot be the whole story of professional ethics, or of the normative deliberations in which professional practitioners need to engage to respond adequately to the diverse needs or interests of clients, patients or pupils. As already noticed, Kant conceived the main aim of moral reflection and deliberation as the formulation of general obligations or duties regarding the promotion of justice as equal respect for persons that are liable to be compromised by the less altruistic urgings of self-interest. And, to be sure, much professional reflection and deliberation seems to be of this ‘universalising’ kind. Much is concerned, in line with the Hippocratic conception of professional ethics, with the formulation of rules and principles – the do’s and don’t’s – of professional conduct, that usually find their way into those so-called codes of professional ethics designed to govern the conduct of many recognised professions. Such are the basic rules of professional engagement that professional practitioners ignore at their peril. These may, precisely, rule strictly and absolutely against certain kinds of conduct – inappropriate personal liaisons between professionals and clients, breaches of confidence, the misuse or misappropriation of professional time and resources for personal advantage or purposes and so on – that court professional censure if not deregistration or dismissal. And, in

accordance with such deontological principles, much professional conduct will be – at least to that extent – a matter of observing and following set procedures or ‘going by the book’. However, most if not all received literature on professions and professionalism emphasises another significant aspect or quality of professional conduct – that of personal ‘autonomy’ – which is invariably invoked to contrast professions with the mechanical rule-following of many other human occupations.

1.4 Extended and Restricted Professionalism

To be sure, one might measure and/or contrast human occupations in terms of the levels of individual responsibility they demand of practitioners. Insofar, while all occupations – however prestigious – are likely to involve variable mixtures of individual responsibility and submission to some authority, we can easily think of jobs that are higher on the obedience spectrum or lower on the responsibility scale than others. To say this is not necessarily, if at all, to offer a negative evaluation of more routine, compliant or ‘subservient’ occupations. For one thing, there would appear to be some human occupations, such as soldier or monk (without denying that good soldiers and monks will need to exercise individual initiative and responsibility in some contexts) in which an occupationally significant degree of obedience is a clear *virtue*, and disobedience tantamount to (occupational) *vice*. Further to this, there are clearly many jobs in private and public service sectors – from factory production to hotel room cleaning – with regard to which reliable routine rather than creative imagination is the order of the day. Again, given natural variations of human temperament, it is not uncommon to find that occupations of low responsibility and high-obedience are often sought by those who prefer working lives of relatively low stress in which the burdens of responsibility are carried by others in higher managerial positions. In many important spheres of public service, then, the main role will be to do (well) what one is told to do rather than to exercise – at least to any great degree – one’s individual initiative. And such jobs and roles are none the worse for that.

It should be no less clear, however, that other jobs or occupations cannot be – of their very nature – of such submissive or conforming character. Here, to be sure, the contrast is not primarily between the ‘line-managed’ whose role it is to execute the orders of others and the ‘line-managerial’ who are the source of such orders – since it may be that the office boss is no less constrained by rules and regulations than those (s)he is charged with managing. The contrast is rather between those roles and occupations in which there are clear or unambiguous rules and guidelines of correct procedure and those in which there are not or cannot be – at least, in any very clearly specifiable or predictable sense. Thus, whereas there may be only one way to wash a stair or fry chips – or, at any rate, where any creative variations of such tasks are likely to count as unwelcome departures from some prescribed and largely agreed ideal – there are many possible ways to treat a patient, care for the elderly, nurse the sick, minister to a parish, or teach a child. Again the key point is not just that more

alternative courses of action may be available in these occupational roles, so that it may be harder – and therefore require more deliberation and skill – to find the right way of proceeding. It is rather that there is likely to be less general agreement – even within the occupations or professions in question – about what *counts* as the right thing to do in this or that circumstance. Thus, the essence of the undoubted complexity of medical practice, social work or teaching is that the basic goals and values of such occupations are – as it seems nowadays fashionable to put this – ‘essentially contested’.

To be sure, one needs to be careful with this kind of talk in such professional spheres as medicine, social work and education – and I have elsewhere criticized some latter day incautious and dangerously relativistic conceptions of essential contestation in such fields (Carr 2010). Thus, to say that the aims of this or that profession are contested *cannot* be to say that anything we (individually or collectively) *choose* may count as medicine, law or education, or that there cannot be plainly mistaken approaches to professional conduct in such fields. On the contrary, there is quite obviously significant and substantial agreement among sane and sensible practitioners about the general purposes, aims and values of medicine, law and education. Notwithstanding such fundamental agreement, however, individual doctors, lawyers, nurses, social workers and teachers may daily have to face hard decisions about how best to secure the medical health or progress of this patient, ensure the safety of these children at risk, or address the behavioural problems of that pupil. It is faced with such potentially life changing, even life or death, challenges that the need for some informed professional initiative becomes all too apparent. Two social workers may agree substantially about what it is for Mary to live a psychologically and physically healthy and flourishing life: what may be less clear is whether this is best assisted by taking her away from her parents and into care, or by leaving her with her parents. Moreover, although it may be all too tragically clear that Mary’s prospects of short or long term flourishing are liable to be dim in some respects whatever the decision, it is all the more, rather than less, important for the professional social worker to make the most informed and considered decision that (s)he can based on the most thorough possible knowledge of her circumstances.

Still, while issues and challenges of this complex kind would seem to be the stuff of such professional practices as medicine, law, social work, nursing and teaching they are hardly, if at all, characteristic of office cleaning, hamburger grilling or auto-assembly. Indeed, much recent debate about professions and professionalism has turned on this consideration. In this connection, while we have already indicated that such occupations as teaching, nursing and social work have sometimes been regarded (by sociologists) as ‘semi-professions’ – because they do not seem to satisfy all the professional criteria of standard professions – a related distinction has been drawn between ‘restricted’ and ‘extended’ profession(alism) (Hoyle 1974; see also Kirk 1988). Basically, this registers a difference between those clerical and other ‘white collar’ jobs in which workers observe 9–5 routines and take only minimum ‘jobs-worth’ responsibility for the further development of the professional practice in which they are now engaged, and those occupations in which workers are directly involved in the wider development of professional values, aims and objectives

way beyond the call of strict requirement or duty. The latter, so-called 'extended professional', is the professionally pro-active agent who is prepared to take time – outside any and all minimally prescribed working hours – to engage in discussion, enquiry and research regarding the progressive development of professional principles and procedures, to attend professional conferences and seminars, to assist with the education and training of junior colleagues, to take individual responsibility and initiative (rather than passing the buck) in circumstances of professional uncertainty and dilemma, and so on. As already noted, one of the most evident bones of contention regarding (for example) teacher professionalism has concerned recent political attempts in the United Kingdom and elsewhere to 'de-professionalize' teachers mainly via the imposition of state mandated (national) curricula and so-called 'competence' models of professional training that aim for tight prescription of educational content and methods. In the face of such narrow definition and direction of educational aims and content, the teacher – so it is complained – is reduced to the level of a 'classroom technician' whose only role is obedience to the *de haut en bas* dictates of others (including extra-professional politicians and civil servants).

Not surprisingly, teacher unions, professional associations and theorists of teacher education have vigorously resisted the 'restricted' model of teacher professionalism of political imposition and prescription. At the level of principle and theory, it has been pointed out that teaching cannot be a matter of such simple compliance and prescription and that the kind of decisions with which teachers are daily faced are such as to call for educated, sensitive – and highly contextualised – judgement that defies reduction to mechanical rule following. Any informed or 'insider' perspective on the actual practice of teaching shows clearly that it is a highly complex and challenging activity involving sophisticated levels of educational insight and interpersonal sensitivity that cannot be boiled down to routine skills or techniques. At the level of professional practice this has more recently led (in many countries) to professional and political efforts to improve the initial or pre-service quality of teacher education and training – in terms of both content and duration (by, for example, raising college training courses to university undergraduate status) – and to continue or extend the professional development of teachers into post-training employment via so-called CPD (continuing professional development) courses that aim to 'refresh' teachers with new research-based theoretical and practical knowledge of teaching. Indeed, practising teachers may also be involved in the development of new educational curricula and teaching methods or strategies and encouraged to mentor new recruits to the profession. A recent initiative, taking in-service professional development of teachers to a significantly higher level, has been the introduction (in, for example, Scotland) of a new university Masters' degree in teaching, leading to the award of 'Chartered teacher' and bringing higher professional status and further remuneration to non-promoted teachers who wish to improve their professional understanding and craft skills without having to leave the 'chalk face' for more managerial or administrative positions.

It is precisely in view of such considerations about 'extended' professionalism, however, that we may seem to need a new model of reflection and deliberation

through which the normative complexities and uncertainties of the contemporary professional lives of doctors, lawyers, nurses, social workers and teachers might be addressed. While we have seen that a broadly Kantian-Hippocratic conception of practical reason serves well enough to define the basic moral contours of professional conduct that are indispensable to both restricted and extended professionalism – such as the definition of client rights and professional obligations and the marking of those moral boundaries that members of professions should not overstep – it would also seem that a deontological account is less well able to explain the difference between the ‘jobs-worth’ rule-following of restricted professionals and the capacity of extended professionals for more flexible and pro-active judgement and deliberation in uncertain and contextually-sensitive circumstances. What is also needed is an account of professional judgement and deliberation that may assist professional practitioners to effective action in circumstances: (i) in which there may be no clear rule or precedent for present procedure; (ii) in which certain fundamental professional values, principles or prescriptions may actually be in some tension or conflict; or (iii) in which some judicious departure from established rules or procedures may be in order in the interest of fair or virtuous practice. It would be an added bonus of such an account if it could also help to show – as deontological accounts do not – the significant place of affect as well as cognition in the working lives of such professional practitioners as (particularly) nurses, social workers and teachers. We may now turn to Aristotle’s conception of ‘*phronesis*’ or practical wisdom for an account of moral deliberation more fitted to this purpose.

1.5 Professional ‘Phronesis’

Whereas Kant is arguably the master modern theorist of the various types and limits of human reason, Aristotle is no less evidently the master theorist of rationality of antiquity. In the first pages of his *Nicomachean Ethics*, Aristotle (1941b, book 1, chapter 6, p. 940) takes his own master Plato to task for mistakenly assimilating practical deliberation concerning the nature of human good or virtue to the theoretical reason of Platonic dialectic – arguing that it is not the purpose of moral deliberation to discover definitions of the good, but to help us become good or virtuous agents. In the sixth book of that work, he offers a complex taxonomy of human rationality that distinguishes five main types of reason by reference to their different and relatively distinct aims and purposes. For present purposes, however, we may focus on two presently relevant Aristotelian distinctions. First, he distinguishes theoretical rationality (*episteme*) – broadly the sorts of enquiries that are primarily concerned with the discovery of (in his terms, *necessary*) truths about the nature of reality – from those more practical kinds of reasoning directed towards the achievement of certain good, worthwhile or effective ends in the world. But secondly, he distinguishes within the sphere of practical reason between *techne* or productive deliberation – the kind of reasoning involved in the development and exercise of techniques or skills for the making of (say) works of art – and the moral deliberation that he calls *phronesis*

or practical wisdom. Basically, Aristotle distinguishes these different kinds or modes of human reason or reflection in terms of their purposes and/or objects: whereas the aim of theoretical reason (in the sciences and elsewhere) is the discovery of *truth*, and the aim of technical reasoning is the efficient *production* of artefacts or artworks, the aim of *phronesis* or practical wisdom is the cultivation of sound moral character and conduct. As Aristotle puts it, practical wisdom aims to make us good persons or agents (Aristotle 1941b, book 2, chapter 2, p. 953).

It should be clear enough from what has been said so far that – notwithstanding any and all theoretical or technical knowledge or expertise required for effective professional practice or conduct – such conduct is no less deeply implicated in moral principle, judgement and deliberation. Indeed, it is the present view that the very idea of professional service is a fundamentally *moral* one; that issues and questions about the promotion of this or that aspect of human good or flourishing are central to the conduct of any and all occupations meriting professional status; and that any theoretical or technical knowledge which professional agents may indeed require for the effective prosecution of the various moral ends or goals of professional service are at least *normatively* secondary to or subservient of such ends. In short, doctors do not just need medical knowledge or surgical skills, but the wisdom to employ these in the best interests of patients' health; lawyers need not just legal knowledge, but the judgement to ensure that such knowledge conduces to the benefit of clients; teachers need not just the academic knowledge and pedagogical skills required for effective practice, but some understanding of how, when and where to use such knowledge and skills to the ultimate educational welfare of each and every pupil in their care. As we have seen, a deontological (Kantian-Hippocratic) account of the logic of moral principles – in terms of universal obligations to meet fundamental human needs – goes some way to explaining the ethical basis of certain general professional duties, requirements or prohibitions, but it fares less well in accounting for those aspects of professional life and practice in which practitioners may need to make *particular* judgements about what to do in circumstances where there can be no easy or mechanical resort to general rules.

In this regard, Aristotelian practical wisdom may be variously contrasted with Kantian practical reason. To be sure, one way in which Aristotle's account of moral reason is commonly contrasted with Kant's is as an ethics of *judgement* rather than an ethics of *principle*. But this is misleading insofar as Aristotle recognises no less than Kant the importance of definite rules and principles in moral deliberation – even though his account of why such rules are normatively unexceptionable is somewhat different from Kant's. To be sure, he recognises well enough that actions such as adultery, murder and lying are always bad or wrong – even though there may be some circumstances in which we may be forced to *do* the wrong thing as the lesser of competing evils (such as lying to save lives). It may therefore be more accurate to say that Aristotle's conception of moral wisdom is rather broader than Kant's account of practical reason insofar as it *also* tries to explain how moral agents deliberate to judgements in circumstances where there is no obvious covering rule – or, perhaps, some conflict between more general rules (see Carr 2003). It is, however, still more accurate to contrast the general ethics in which Aristotle's notion

of *phronesis* is implicated as an *aretaic* ethics (or ethics of character) rather than a *deontological* ethics (or ethics of duty). On the former view, the key point is that the more particular deliberations and judgements required for complex moral decision making presuppose the development of a range of personal qualities of good character that have been generally termed – since the Greeks – moral *virtues*. Since such virtues involve aspects of human nature that are not only or exclusively cognitive, another way of expressing this would be to say that in order to be a competent moral agent one needs not just moral reasoning skills (even if it is coherent so to speak), but to be a certain kind of *person*. This, to be sure, is essentially the position of so-called *virtue ethics*.

The virtues of (neo-Aristotelian and other) virtue ethics are such moral traits as honesty, justice, courage, persistence, temperance (self-control), generosity, patience, loyalty, industry and so forth. At one level, such virtues are – as Aristotle famously argued in his *Nicomachean Ethics* – primarily developed as practical dispositions, which may not seem to require much reflection or deliberation at all: the courageous agent is (s)he who may be counted on to leap to save the drowning child without a moment's thought. However, Aristotle was no less clear that – at a more mature or developed level – virtues require to be rationally informed or guided: in short, for him, all so-called moral virtues need to be grounded in or informed by the intellectual virtue of *phronesis* or moral wisdom. More precisely, *phronesis* involves judicious observance in each morally demanding circumstance of Aristotle's famous principle of the *mean* – whereby all virtuous actions should aim to avoid certain excesses or defects of feeling, appetite and/or desire. Hence, in contrast to some conceptions of virtue as a matter of the rational control, suppression or even elimination of affective or appetitive life, courageous agents are not those who lack fear and temperate agents may still enjoy (appropriate) appetites: indeed, agents without fear are not virtuous but reckless – and, similarly, any lack of normal human appetite would presumably be sub-human or pathological rather than virtuous. So to be virtuous is to have ordered one's affective, appetitive or desiderative life in a humanly beneficial way: as the present author has elsewhere, put this, virtues are more or less equivalent to states of states of emotion, feeling or appetite ordered in accordance with some deliberative ideal of practical wisdom (Carr 2009). The key task of the rational capacity of *phronesis* or practical wisdom, then, is to order and inform the affective and appetitive aspects of human experience and to determine the appropriate degree of level of exercise and expression of these on this or that occasion. However, if we now ask how we may know whether it is appropriate to indulge this or that appetite (say, sexual desire) or feeling (say, anger) on any given occasion, the general answer is that it must depend on wise adjudication of the precise – but ever variable – context: in Aristotelian terms, morally wise agents are those capable of acting appropriately towards the right agents, with the right motives, in the right place, at the right time, in the right way, and so on.

It should also here be noted that much of the talk so far of reason *and* feeling, or of *phronesis* as intellectual virtue and other virtues as moral virtues, suggests distinctions or dichotomies that Aristotle does not accept or rejects. Or, at least, we should recognise that on his view any emotions implicated in the exercise of virtue

are no mere episodes of (brute) affect, but feelings deeply informed by judgements or evaluations. In more recent philosophical parlance, Aristotelian emotions are inherently (if not exclusively) cognitive or 'intentional': any humanly significant anger is therefore *about* this or that hurt or injustice; our jealousy is *about* attention paid by the object of our affections to another; our compassion or pity is *in respect of* the plight of another; and so on. What this also means, of course, is that insofar as any emotions implicated in *phronesis* entail judgements, they can be *wrong* or erroneous no less than right: the tragedy of Shakespeare's Othello turns precisely on the fact that the Moor's jealousy is quite mistaken or misplaced. That said, one should not conclude that what are sometimes called 'negative' emotions such as fear, anger or jealousy are *always* wrong or mistaken and therefore to be eliminated or suppressed (as some eastern and western spiritualities have occasionally maintained). On the contrary, as Aristotle insisted, the courageous are those who feel appropriate fear and the just are those capable of feeling righteous anger in circumstances in which moral outrage is appropriate. The key point is that effective moral agency is a matter of the cultivation of practical wisdom as sensitive and appropriately attuned cognitive-affective response to the complexities of human experience and association. But then it would seem to follow that insofar as professional judgement and conduct are species – or particular expressions or applications – of basic moral agency, the 'phronetic' cultivation of character should also be part of professional development at least in those occupations commonly regarded as professions. On this view, to be a good or effective doctor, lawyer, social worker, teacher or nurse, one requires capacities for deliberation and judgement grounded in affectively measured and stable character. In sum, to be professionally effective – in the sense of exemplifying the virtues traditionally associated with profession – more is needed than just the knowledge, skills or expertise of a particular occupation; as previously noted, one also needs to be a particular kind of moral agent or *person*.

The key point is that in those human occupations that have traditionally been considered professions – or in some cases, perhaps, as the 'people professions' (see Bondi et al. 2011) of so-called 'vocation' – there is arguably need for more significant occupational continuity between the pre-professional moral agency of admirable character or personhood and exemplary professional practice than in other human occupations and services. On this view, it seems to matter what kind of person (speaking primarily in terms of character) a practitioner of medicine, law, teaching, social work or nursing is in a way that it does not in the case of check-out girls, auto-mechanics, builders, office cleaners or painters and decorators. To be sure, this point should not be overdrawn or misunderstood. Of course many mechanics, builders, cleaners, painters and shop assistants are also admirable people and we may rightly respect them for their personal qualities of character. Their virtues may also contribute to the quality of the service they provide – and, in any case, employers are likely to dispense with their services if their employees are dishonest, lazy or unduly rude or abusive to customers or clients. At all events, we have every reason to encourage – on various grounds and for various purposes – the cultivation of a wide variety of humanly positive characteristics in all sorts of private and public employees. The present point is rather that such virtues or other personal

characteristics seem to be related to such occupations, as it were, only *externally* or *contingently*. The employer wants the employee to be honest or hard-working because this is good for business; the customer may not care much whether the shop assistant is off-hand or surly as long as she gets good advice or a bargain; and the car owner, likewise, wants an efficiently serviced car irrespective of the mechanic's temper. To this extent, we may understand what counts as efficient or effective service in such occupations – not least since refraining from stealing from the till for fear of dismissal does not necessarily indicate an honest person – independently of qualities of character. On the other hand, there is an important sense in which the moral virtues or qualities of character of what we would want to call good or exemplary doctors, lawyers, teachers, nurses or social workers are *internal* or *integral* to the proper professional pursuit of their respective practices.

In short, what we *mean* by effective or exemplary practice in the aforementioned 'professions' can hardly be understood apart from the exercise of virtues of good character. For the Geeks – and in the virtue-ethical tradition generally – the key human virtues were (are) the four so-called 'cardinal' virtues (virtues to which all other virtues may be reduced but which are not themselves reducible to others) of wisdom, courage, temperance and justice. Clearly, for Aristotle, wisdom – as largely exhibited in *phronesis* – is the lynchpin of complete or mature moral virtue. As we have seen, it is hard to understand the moral agency of professional practice without reference to the deliberations of *phronesis*, insofar as the judgement required for such practice cannot be a matter of mechanical rule-following and needs to be sensitive to the complexities of particular context. However, it should be clear that insofar as it is a key aim of such judgements to avoid unequal or partial treatment *and* – where appropriate – to give due weight to professionally relevant individual differences, such practical wisdom operates primarily in the service of that justice which is also a pre-eminent concern of Kantian, Hippocratic and other deontological accounts of professional ethics. But then it should be no less clear that professional practitioners will often require the courage to defend and uphold such judgements and principles of justice when external pressures – of variously interested political or public opinion – may pressure them to compromise such principles. Many professional 'scandals' have revolved around the failures of integrity of those in high professional office to stick to their guns in the face of intimidation from outside political or corporate commercial agencies driven by less than just motives. But, likewise, professional scandals have also turned on the failure of practitioners to uphold the highest professional principles of other-directed fairness and justice due to their own greed and self-interest – in short, through manifest failures of temperance or self-control.

To be sure, even this way of putting things might suggest that the role of the traditional virtues of pre-professional moral agency is a predominantly instrumental one: that one needs practical wisdom, justice, temperance and courage in order to pursue the ends of medicine, law, teaching, social, work, ministry or nursing, which nevertheless might be specified independently in terms of certain sorts of academic or technical expertise (such as surgical or teaching skills). However, as I have argued elsewhere (Carr 2000, 2007), it seems hardly possible in the case of many

professional practices to specify such professional knowledge and skill independently of moral virtues: or, to put it even more strongly, what are often widely canvassed as professional skills or techniques in some of these professional fields do not appear – on closer scrutiny – to be (morally neutral) techniques or skills at all (see Carr 2007). Thus, taking one example from the field of professional teaching, one indispensable requirement of effective practice for classroom teachers is the capacity to maintain order and control in the classroom – which has been widely viewed in professional literature in terms of the mastery of skills, techniques or competencies (Department of Education and Science and the Welsh Office 1989). In fact, however, given the diverse contexts of classroom teaching, it may seriously be doubted that there are any such competences or skills – in the sense of one-size-fits-all techniques that will suit all circumstances. Even where something resembling such techniques might be identified (for a given context) it seems clear that these are seldom *sufficient* for classroom order and that what teachers require is a *moral authority* grounded in deep ‘phronetic’ appreciation of the complexities of human association. The reason why young teachers are so often poor at classroom management may well be less because they lack off-the-peg management techniques, and more because they lack the personal knowledge and appreciation of pupils and their circumstances – as individuals, no less than groups – that facilitates healthy association. But what is here true of teaching, also clearly goes for many aspects of general medical practice, nursing, social work, ministry and counselling: moral virtues are not just useful *means* to the job; they actually *are* the job.

Lack of further space precludes more than a mention here of the fifth commonly cited criterion of profession or professionalism that emphasises the need for professional bodies for the oversight, monitoring and regulation of professional practice in the interests of proper recruitment, public accountability and discipline of practitioners. On the one hand, such professional organisations do clearly have a positive role to play in upholding the basic standards of professions and as a bulwark against various political and private interests that might seek to control or manipulate professions for non-professional ends. (One may think here, of recent political attempts to control or manipulate hospitals and schools for non-professional ends.) In this regard, medical, teaching and other councils in Britain and elsewhere have sought reasonably successfully to maintain fundamental professional standards and values and to protect the interests of their professional members. On the other hand, however, there is the ever-present danger that such organisations may themselves take an unduly narrow or restricted view of professional standards, values and practices that may itself impede or restrict professional creativity or innovation. One issue that has been much discussed and debated in this connection is that of the value or utility of those codes of professional ethics whereby various professions have sought to specify precise rules of professional conduct or competence for practitioners. Given the complexities of professional life to which we have alluded – that require scope for individual (‘phronetic’) deliberation and judgement – the problem with such codes is that of finding a meaningful *via media* between largely vacuous generalities (the obvious ‘do and don’t’ presuppositions of everyday professional practice) on the one hand, and the unhelpful constraint of precise prescription on the

other. But achieving this all-important Aristotelian middle way is clearly the holy grail of sane and sensible professional engagement as such.

Presently limited space also precludes much exploration of the all-important topic of professional *education* – particularly of the question of how the professionally crucial quality or capacity of *phronesis* might be cultivated. For one thing, if *phronesis* or practical wisdom requires or presupposes understanding or appreciation of others and their motives – and of the chemistry of human association generally – it should be clear that this cannot be acquired exclusively via the acquisition of occupational knowledge and skills (knowledge of the law or surgical techniques). Thus, it has been customary in many of the so-called ‘people professions’ such as teaching, social work and ministry to include courses on psychology or sociology – and even (more recently) ethics or moral theory – in the training of teachers, ministers and social workers. That said, one may also doubt that the kind of knowledge of human behaviour or association available via the study of the various social and moral sciences is really appropriate to understanding other *people* as required for effective professional communication and engagement. Indeed, although Aristotle himself did seem to think that knowledge of more theoretical kinds could contribute something to our understanding of human psychological and social life, it seems fairly clear that for him the cultivation of *phronesis* depended upon a broad general or *liberal* education to which the arts might make as much contribution as the sciences. Thus, in his *Poetics*, Aristotle clearly regards the works of creative imagination of the great tragic poets of his day as having a large contribution to make to the education of the all-important emotional dimensions of *phronesis*. In short, although professional practitioners of social work, teaching or medicine might well be urged to read books in order to help them acquire the kind of knowledge of others and their interests and motives that might help them to become better professional practitioners, it is arguable that a broader educational acquaintance with the wider literary inheritance of human culture(s) than has often been apparent in courses of professional training might also assist professional development: that, in short, practitioners of social work, medicine or teaching (of anything) might benefit professionally from acquaintance with Euripides Shakespeare, Tolstoy, Hardy or Joyce no less than from textbooks of law, medical science or psychology.

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Chapter 2

The Concept of Professionalism: Professional Work, Professional Practice and Learning

Julia Evetts

Abstract For a long time, the sociological analysis of professional work has differentiated professionalism as a special means of organizing work and controlling workers and in contrast to the hierarchical, bureaucratic and managerial controls of industrial and commercial organizations. But professional work is changing and being changed as increasingly professionals (such as doctors, nurses, teachers, social workers) now work in employing organizations; lawyers and accountants in large professional service firms (PSFs) and sometimes in international and commercial organizations; pharmacists in national (retailing) companies; and engineers, journalists, performing artists, the armed forces and police find occupational control of their work and discretionary decision-making increasingly difficult to sustain.

The paper begins with a section on defining the field of professional work, professional practice and its learning. The paper continues with a second section on the concept of professionalism, its history and current developments. The third section of the paper considers the changes, challenges and opportunities of the practice of professional work within employing organizations. The fourth section of the paper identifies some of the important contributions made by researchers on professional work to public policy developments, assessment and evaluation.

Keywords Professionalism • Professional work • Professional practice • Learning

For a long time, the sociological analysis of professional work has differentiated professionalism, as a special means of organizing work and controlling workers, and in contrast to the hierarchical, bureaucratic and managerial controls of industrial and commercial organizations. Change is a constant feature of professional work but the speed and prominence of change is growing as increasingly professionals

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(such as doctors, nurses, teachers, social workers) now work in employing organizations; lawyers and accountants in large professional service firms (PSFs) and sometimes in international and commercial organizations; pharmacists in national (retailing) companies; and engineers, journalists, performing artists, the armed forces and police find occupational control of their work and discretionary decision-making increasingly difficult to sustain (Adler et al. 2008; Brante 2010; Champy 2011). How, then, are current changes affecting perceptions of professionalism, professional practice and learning?

There also have been a number of policy and societal developments and changes, and increased complexities in the contexts and environments for professions. This makes it necessary to look again at the theories and concepts used to explain and interpret this category of occupational work. Some long-established differences are becoming blurred. For example, there is no longer a clear differentiation between the public and the private sectors of professional employment. Private funding is now operational in public sector work places and PPP (public/private partnerships) (e.g. in schools, universities and hospitals) enables the promotion of new capital as well as other policy developments (Farrell and Morris 2003; Kuhlmann 2006).

Another complication and variation is the increased emphasis on and calls for professionalism in the voluntary sector, charities and non-governmental organizations (NGOs) (Langer and Schröer 2011). Wherever trust, transparency and accountability need to be demonstrated, then increased regulation, audit and assessment seem to follow (e.g. social work and aid agencies, national and international). In addition, there is wider accessibility to internet knowledge which renders the importance of professional and expert, tacit and experiential knowledge and expertise more open to challenge (Olofsson 2009; Verpraet 2009).

The role of the nation-state, has always been critical in theorizing about professions and, in particular, differentiating between Anglo-American and European systems of professions (Burrage and Torstendahl 1990a, b). The role of the nation-state had been seen to be paramount because states had granted legitimacy, for example, by licensing professional activity, setting standards of practice and regulation, acting as guarantor of professional education (not least by giving public funds for academic education and scientific research), and by paying for services provided by professional experts and practitioners. But the internationalization of markets required the reconceptualization of traditional professional jurisdictions. In addition, the increased mobility of professional practitioners between nation-states necessitated recognition and acceptability of other states licensing, education and training requirements (Evetts 2008; Orzack 1998). Again, the convergence of professional systems and of regulatory states has required the reconceptualization as well as new theoretical and interpretational developments in the sociology of professional occupational groups (Brint 2006; Noordegraaf 2007; Svensson and Evetts 2003, 2010).

The chapter begins with a section on defining the field of professional work, professional practice and its learning. Three concepts (profession, professionalization and professionalism) will be identified and explored. The difficulties associated with the concepts of profession and professionalization will be indicated and

the advantages of the concept of professionalism will be explained. The chapter continues with a second section on the concept of professionalism, its history and current developments. Three phases will be identified: an early phase which defined professionalism as an occupational or normative value; a second negative phase of critique when professionalism was dismissed as ideological and promoted in the interests of professional practitioners themselves; the third phase which constitutes a reappraisal and a return to professionalism and combines both the ideological critique and the normative value interpretations of professionalism. In this third phase professionalism is defined as a discourse, used by managers in organizations, and reclaimed as an important and distinctively different way of organizing service sector work, which is in the best interests of customers and clients as well as practitioner workers themselves. Professionalism, like professional work and learning, is changing and being changed particularly in the organizational contexts in which practitioners currently practice.

The third section of the chapter considers the changes, challenges and opportunities of the practice of professional work within employing organizations. The need to reconnect professional occupations and professional organizations will be identified and the challenges this presents to professionalism as a normative value, which implies occupational control of the work practices and procedures, will be explained. The opportunities presented for professional practitioners working in organizations will also be discussed.

The fourth section of the chapter identifies some of the important contributions made by researchers on professional work to public policy developments, assessment and evaluation. The idea of professionalism as an occupational and normative value can be linked with public policy concerns about competences at all levels of occupational work. Perhaps the reclaiming and recreation of professionalism in work and occupations will be one of the most important tasks for policy makers and practitioners over the next few years.

2.1 Defining the Field and Clarifying Concepts

The concept of profession is much disputed (Sciulli 2005 and Evetts' 2006 response) and this is a difficulty for defining the field of professional work, professional practice and professional learning. For a period in the 1950s and 1960s, researchers shifted the focus of analysis onto the concept of profession as a particular kind of occupation, or an institution with special characteristics. The difficulties of defining the special characteristics and clarifying the differences between professions and other occupations (particularly other expert occupations) troubled analysts and researchers during this period (e.g. Greenwood 1957; Etzioni 1969; Wilensky 1964). It is generally the case, however, that definitional precision is now regarded more as a time-wasting diversion, in that it did nothing to assist understanding of the power of particular occupational groups (such as law and medicine, historically) or of the contemporary appeal of the discourse of professionalism in all occupations (Champy 2009). To most researchers

in the field (e.g. Brint 2001; Olgiati et al. 1998; Sciulli 2005) it no longer seems important to draw a hard and fast line between professions and occupations but, instead, to regard both as similar social forms which share many common characteristics (Olofsson 2009).

Hughes (1958) was probably the first sociologist to argue that the differences between professions and occupations were differences of degree rather than kind. For Hughes not only do professions and occupations presume to tell the rest of their society what is good and right for it, but also they determine the ways of thinking about problems which fall in their domain (Dingwall and Lewis 1983: 5). Professionalism in occupations and professions implies the importance of trust in economic relations in modern societies with an advanced division of labour. In other words, lay people have to place their trust in professional workers (electricians and plumbers as well as lawyers and doctors) and some professionals must acquire confidential knowledge. Professionalism, therefore, requires those working as professionals to be worthy of that trust, to put clients first, to maintain confidentiality and not use their knowledge for fraudulent purposes. In return for professionalism in client relations, some professionals are rewarded with authority, privileged rewards and high status. Subsequent analysis has interpreted high rewards to be the result of occupational powers rather than professionalism, but this was one result of the rather peculiar focus on medicine and law as the archetypal professions in Anglo-American analysis, rather than a more realistic assessment of the large differences in power resources of most occupational groups (Freidson 1983; Hanlon 1999; Johnson 1992).

The comparative work of Hughes, and his linking of professions and occupations, also constitutes the starting point for many micro level ethnographic studies of professional socialization in work places (e.g. hospitals and schools) and the development (in new) and maintenance (in existing) workers of shared professional identities. This shared professional identity (which has been a major research focus for French researchers) is associated with a sense of common experiences, understandings and expertise, shared ways of perceiving problems and their possible solutions. This common identity is produced and reproduced through occupational and professional socialization, by means of shared educational backgrounds, professional training and vocational experiences, and by membership of professional associations (local, regional, national and international) and institutes where practitioners develop and maintain a shared work culture.

One result of all these factors is similarities in work practices and procedures, common ways of perceiving problems and their possible solutions, and shared ways of perceiving and interacting with customers and clients. In these ways the normative value system of professionalism in work, and how to behave, respond and advise, is reproduced at the micro level in individual practitioners and in the work places in which they work (Abbott 1988; Hughes 1958). Some of the differences in occupational socialization between occupations have been identified, but the general process of shared occupational identity development via work cultures, training and experience was regarded as similar across occupations and between societies. Research into occupational identities has been prominent in

French analyses (e.g. Dubar 2000) because the rather peculiar emphasis on occupational privileges and powers, in Anglo-American research, has had less influence on the definition of the field in France.

Many researchers focus on a particular case study professional/occupational group and handle the definitional problem in different ways. Some avoid giving a definition of profession and instead offer a list of relevant occupational groups (e.g. Hanlon 1998 claimed to be following Abbott 1988). Others have used the disagreements and continuing uncertainties about precisely what is a profession, to dismiss the separateness of the intellectual field, although not necessarily to dispute the relevance of current analytical debates. Crompton (1990), for example, considered how paradoxes and contradictions within the sociological debates about professions actually reflected wider and more general tensions in the sociologies of work, occupations and employment.

For most researchers, professions are regarded as essentially the knowledge-based category of service occupations which usually follow a period of tertiary education and vocational training and experience. A different way of categorizing professions is to see them as the structural, occupational and institutional arrangements for work associated with the uncertainties of modern lives in risk societies. Professionals are extensively engaged in dealing with risk, with risk assessment and, through the use of expert knowledge, enabling customers and clients to deal with uncertainty. To paraphrase and adapt a list in Olgiati and colleagues (1998), professions are involved in birth, survival, physical and emotional health, dispute resolution and law-based social order, finance and credit information, educational attainment and socialization, physical constructs and the built environment, military engagement, peace-keeping and security, entertainment, the arts and leisure, religion and our negotiations with the next world.

In general, however, it no longer seems important to draw a hard definitional line between professions and other (expert) occupations (see Svensson and Evetts 2003). The operational definition of profession can be highly pragmatic. The field includes the study of occupations which are predominantly service sector and knowledge-based and achieved sometimes following years of higher/further education and specified years of vocational training and experience. Sometimes professional groups are also elites with strong political links and connections, and some professional practitioners are licensed as a mechanism of market closure and the occupational control of the work. They are primarily middle-class occupations sometimes characterised as the service class (Goldthorpe 1982).

In sociological research on professional groups, three concepts have been prominent in the development of explanations: (i) profession, (ii) professionalization, (iii) professionalism. The concept of profession represents a distinct and generic category of occupational work. Definitions of 'profession' have been frequently attempted but sociologists have been unsuccessful in clarifying the differences between professions and other occupations and identifying what makes professions distinctive. Definitions of professions as institutional remain unresolved though particular generic occupational groups continue to form the case studies in which to examine and test sociological theories and explanations.

The concept of professionalization is regarded as the process to achieve the status of profession. It has been interpreted as the process to pursue, develop and maintain the closure of the occupational group, in order to maintain practitioners own occupational self-interests in terms of their salary, status and power, as well as the monopoly protection of the occupational jurisdiction (Larson 1977; Abbott 1988). This interpretation was prominent in the field in the 1970s and 1980s and was associated with a critique of professions as ideological constructs (Johnson 1972). This interpretation has declined in popularity recently (e.g. see themes of papers presented at recent international conferences) although sociologists interested in gender issues and differences continue to critique the idea of profession as a gendered (historical) construct (Davies 1995; Witz 1992), and sometimes as the opposite – as a process that has benefited particularly female-dominated occupational groups (e.g. midwifery) in competition with medical dominance (Bourgeault et al. 2004). In addition, the concept of professionalization continues to be important in the analysis of newly emerging occupations (e.g. IT consultancy, human resources management, psychology and social care work), perhaps seeking status and recognition for the importance of the work, often by standardization of the education, training and qualification for practice (Brint 2001; Ruiz Ben 2009).

A third concept is professionalism which has had a long history in the disciplinary sub-field and is examined in the next section. Professionalism was usually interpreted as an occupational or normative value, as something worth preserving and promoting in work and by and for workers. Then later developments interpreted professionalism as a discourse and, to an extent, this has combined the occupational value and the ideological interpretations. Certainly there are real advantages in the analysis of professionalism as the key analytical concept in explanations and interpretations about professional knowledge-based work, occupations and practitioners.

In current work and employment contexts (such as professional work in organizations) it is the increased use of the discourse of professionalism, in a wide range of occupations and work places, which is important and in need of further analysis and understanding. The discourse of professionalism is used as a marketing slogan (e.g. ‘have the job done by professionals’) and in advertising to attract new recruits (e.g. ‘join the professionals’ – the army) as well as customers (Fournier 1999). It is used in occupational recruitment campaigns, in company mission statements and organizational aims and objectives to motivate employees. The discourse of professionalism has entered the managerial literature and been embodied in training manuals. Even occupational regulation and control (both internal and external forms) are now explained and justified as means to improve professionalism in work. The concept of professionalism has an appeal to and for practitioners, employees and managers in the development and maintenance of work identities, career decisions and senses of self.

If the focus of analysis is shifted away from the concepts of profession (as a distinct and generic category of occupational work), and professionalization (as the process to pursue, develop and maintain the closure of the occupational group), and towards the concept of professionalism, then different kinds of explanatory theory become apparent. Then the discourse of professionalism can be analyzed as a

powerful instrument of occupational change and social control at macro, meso and micro levels and in a wide range of occupations in very different work, organizational and employment relations, contexts and conditions.

2.2 Professionalism : History and Current Developments

The concept of professionalism has a long history particularly in Anglo-American sociology. In Europe the concept has been less prominent until recently. The continental functional proximity between state government bureaucracies, public state universities and professions created a minority of free professions ('freie Berufen' and 'professions liberals') and favoured sociology of class and organization to the disadvantage of sociology of professions (Burrage and Torstendahl 1990a). The Anglo-American systems of less centralized state governments, private or at least relatively independent universities and free professions, on the other hand, created a majority of market-related professions and an elaborate and detailed sociology of professions, which has had strong impact worldwide.

When considering the history of the concept of professionalism, three phases can be identified: an early phase which defined professionalism as an occupational or normative value; a second negative phase of critique when professionalism was regarded as ideological and promoted in the interests of professional practitioners themselves; a third phase which combines both the ideological critique and the normative value interpretations of professionalism. These three phases are considered next.

2.2.1 Early Phase: Professionalism as a Normative Value

In early British sociological analysis, the key concept was 'professionalism' and the emphasis was on the importance of professionalism for the stability and civility of social systems (e.g. Tawney 1921; Carr-Saunders and Wilson 1933; Marshall 1950). Tawney perceived professionalism as a force capable of subjecting rampant individualism to the needs of the community. Carr-Saunders and Wilson (1933) saw professionalism as a force for stability and freedom against the threat of encroaching industrial and governmental bureaucracies. Marshall (1950) emphasized altruism or the 'service' orientation of professionalism and how professionalism might form a bulwark against threats to stable democratic processes. In these interpretations professionalism was regarded as an important and highly desirable occupational value and professional relations were characterized as collegial, co-operative and mutually supportive. Similarly, relations of trust characterized practitioner/client and practitioner/management interactions since competencies were assumed to be guaranteed by education, training and sometimes by licensing.

The early American sociological theorists of professions also developed similar interpretations and again the key concept was the occupational value of professionalism based on trust, competence, a strong occupational identity and co-operation. The best known, though perhaps most frequently mis-quoted, attempt to clarify the special characteristics of professionalism, its central values and its contribution to social order and stability, was that of Parsons (1939). Parsons recognized and was one of the first theorists to show how the capitalist economy, the rational-legal social order (of Weber), and the modern professions were all interrelated and mutually balancing in the maintenance and stability of a fragile normative social order. He demonstrated how the authority of the professions and of bureaucratic hierarchical organizations both rested on the same principles (for example of functional specificity, restriction of the power domain, application of universalistic, impersonal standards). The professions, however, by means of their collegial organization and shared identity demonstrated an alternative approach (compared with the managerial hierarchy of bureaucratic organizations) towards the shared normative end.

The work of Parsons has subsequently been subject to heavy criticism mainly because of its links with functionalism (Dingwall and Lewis 1983). However, the differences between professionalism and rational-legal, bureaucratic ways of organizing work have been examined in Freidson's (2001) analysis. He examined the logics of three different ways of organizing work in contemporary societies: (i) the market, (ii) organization and (iii) profession and illustrated the respective advantages and disadvantages of each for clients and practitioners. In this analysis he also demonstrated the continuing importance of maintaining professionalism (with some changes) as the main organizing principle for service sector work. Freidson does not use the term 'occupational value' and instead focused on the importance of knowledge and expertise, but he maintained that occupational control of the work (by practitioners themselves) is of real importance for the maintenance of professionalism. Practitioner occupational control is important because the complexities of the work are such that only the practitioners can understand the organizational needs of the work, its processes, procedures, testing and outcomes. It is by means of extensive (and expensive) systems of work place training and socialization that new recruits develop the expertise to put theoretical knowledge into practice and to use and control the work systems and procedures.

This interpretation represents what might be termed the optimistic view of what professionalism and the process of professionalization of work entails. It is based on the principle that the work is of importance either to the public or to the interests of the state or an elite (Freidson 2001: 214). According to Freidson, 'the ideal typical position of professionalism is founded on the official belief that the knowledge and skill of a particular specialization requires a foundation in abstract concepts and formal learning' (2001: 34/5). Education, training and experience are fundamental requirements but once achieved (and sometimes licensed) then the exercise of discretion (i.e. discretionary decision-making rather than autonomy) based on competences is central and deserving of special status. The practitioners have special knowledge and skill and, because of complexity, it is often necessary to trust professionals' intentions. One consequence is that externally imposed rules (from states or

organizations) governing the work are minimized and the exercise of discretionary decision-making and good judgment, often in highly complex situations and circumstances, and based on recognized competences is maximized.

It can also be argued that professionalism represents a distinctive form of decentralized occupational control and regulation which constitutes an important component of civil society. Professions create and maintain distinct professional values or moral obligations (e.g. codes of ethics), which restrain excessive competition by encouraging cooperation as well as practitioner pride and satisfaction in work performance – a form of individualized self-regulation. Indeed it could be argued that professional commitment (professionalism) has frequently covered for the various failures of statutory and organizational forms of work regulation. Where statutory and organizational forms have been seen to impoverish the quality of work, and increase the bureaucracy, professionalism can be defended as a uniquely desirable method of regulating, monitoring and providing complex services to the public (Freidson 2001).

2.2.2 Critical Phase: Professionalism as Ideology

There is a second more pessimistic interpretation of professionalism, however, which grew out of the more critical literature on professions, which was prominent in Anglo-American analyses, in the 1970s and 1980s. During this period professionalism came to be dismissed as a successful ideology (Johnson 1972), and professionalization as a process of market closure and monopoly control of work (Larson 1977), and occupational dominance (Larkin 1983). Professionalization was intended to promote professional practitioners' own occupational self interests in terms of their salary, status and power as well as the monopoly protection of an occupational jurisdiction (Abbott 1988). This was seen to be a process largely initiated and controlled by the practitioners themselves and mainly in their own interests although it could also be argued to be in the public interest (Saks 1995).

Critical attacks on professions in general as powerful, privileged, self-interested monopolies, that were prominent in the neo-Weberian research literature of the 1970s and 1980s, resulted in a general skepticism about the whole idea of professionalism as a normative value. Johnson, for example, dismissed professionalism as a successful ideology which had entered the political vocabulary of a wide range of occupational groups in their claims and competition for status and income (1972: 32). More recently Davies (1996) has urged researchers to abandon claims to professionalism and instead to recognize the links between such claims and a specific historical and cultural construction of masculinity which fits uneasily with newer and more feminized professions.

During the 1970s and 1980s, when sociological analysis of professions was dominated by various forms of professionalism as ideology theorizing, one concept that became prominent was the 'professional project'. The concept was developed by Larson (1977) and included a detailed and scholarly historical

account of the processes and developments whereby a distinct occupational group sought a monopoly in the market for its service, and status and upward mobility (collective as well as individual) in the social order. The idea of a professional project was developed in a different way by Abbott (1988) who examined the carving out and maintenance of a jurisdiction through competition and the requisite cultural and other work that was necessary to establish the legitimacy of the monopoly practice.

Larson's work is still frequently cited and MacDonald's textbook on professions (1995) continued to use and to support her analysis in his examination of the professional field of accountancy. The outcome of the successful professional project was a 'monopoly of competence legitimised by officially sanctioned "expertise", and a monopoly of credibility with the public' (Larson 1977: 38). This interpretation has not gone unchallenged. Freidson (1982) preferred market 'shelters' to complete monopolies in professional service provision, which indicated the incomplete nature of most market closure projects. It is also the case that Larson's (1977) careful analysis has been oversimplified by enthusiastic supporters such that some researchers talk about the professional project, as if professions and professional associations do nothing else apart from protecting the market monopoly for their expertise.

Another version of the professionalism as ideology interpretation has been the notion of professions as powerful occupational groups, who not only closed markets and dominated and controlled other occupations in the field, but also could 'capture' states and negotiate 'regulative bargains' (Cooper et al. 1988) with states in the interests of their own practitioners. Again this was an aspect of theorizing about professions in Anglo-American societies which began in the 1970s (e.g. Johnson 1972) and which focused on medicine and law. It has been a particular feature of analysis of the medical profession (e.g. Larkin 1983) where researchers have interpreted relations between health professionals as an aspect of medical dominance as well as gender relations (e.g. Davies 1995).

Since the mid-1980s, the flaws in the more extreme versions of this professionalism as ideology view have become apparent. Annandale (1998) has queried aspects of medical dominance and has linked this with diversity, restratification and growing hierarchy within the medical profession itself – namely only some doctors can become dominant, along with some nurses and some midwives. More generally, it has turned out that radical governments could successfully challenge the professions. Professions do sometimes initiate projects and influence governments but, as often, professions are responding to external demands for change, which can be political, economic, cultural and social. This has resulted in a reappraisal of the historical evidence, which is still incomplete. One line of development has been the view that the demand-led theory of professionalization needs to be complemented by an understanding of the supply side (Dingwall 1996). Instead of the question – How do professions capture states? – the central question should be – Why do states create professions, or at least permit professions to flourish? This has resulted in a renewed interest in professionalism as normative values interpretation, and in the historical evidence about the parallel processes of the creation of modern

nation-states in the second half of the nineteenth century and of modern professions in the same period. It is suggested, for example, that professions might be one aspect of a state founded on liberal principles, one way of regulating certain spheres of economic life without developing an oppressive central bureaucracy. The work of the English sociologist Herbert Spencer has provided a useful starting point for this analysis (Dingwall and King 1995) and Dingwall (1996) takes this argument further by considering the need for social order in the rapidly developing global economies and international markets, and how professions might make a normative and value contribution in meeting this need.

In the 1990s researchers began to reassess the significance of professionalism and its positive (as well as negative) contributions both for customers and clients, as well as for social systems. This re-examination indicates a return to the professionalism as normative value system interpretation. One result of this return and re-appraisal is a more balanced assessment, however, (Dingwall 2008; Evetts 2003; Fournier 1999). Thus, in addition to protecting their own market position through controlling the license to practice and protecting their elite positions, professionalism might also represent a distinctive form of decentralized occupational control which is important in civil society (Durkheim 1992). It has also been argued that the public interest and professional self-interest are not necessarily at opposite ends of a continuum and that the pursuit of self-interests may be compatible with advancing the public interest (Saks 1995). Professionalism might also work to create and represent distinct professional values or moral obligations which restrain excessive competition and encourage co-operation (Dingwall 1996).

The claim is now being made (for example, Freidson 1994, 2001) that professionalism is a unique form of occupational control of work which has distinct advantages over market, organizational and bureaucratic forms of control. In assessing the political, economic and ideological forces that are exerting enormous pressure on the professions today, Freidson (1994) has defended professionalism as a desirable way of providing complex, discretionary services to the public. He argues that market-based or organizational and bureaucratic methods impoverish and standardize the quality of service to consumers and demotivates practitioners, and he goes on to suggest how the virtues of professionalism can be reinforced. Thus, professions might need to close markets in order to be able to endorse and guarantee the education, training, experience and tacit knowledge of licensed practitioners, but once achieved the profession might then be able to concentrate more fully on developing the service-orientated and performance-related aspects of their work (Evetts 1998; Halliday 1987). The process of occupational closure will also result in the monopoly supply of the expertise and the service, and probably also to privileged access to salary and status as well as to definitional and control rewards for practitioners. In respect of these privileges, it is necessary to remember the dual character of professions which include both the provision of a service (and the development of an autonomous form of governance) as well as the use of knowledge and power for economic gain and monopoly control (which pose a threat to civility). The pursuit of private interests is not always in opposition to the pursuit of the public interest, however, and indeed both can be developed simultaneously (Saks 1995).

Halliday (1987) also argued that the emphasis on market monopolies underestimated the breadth of professionalism, especially concerning professional influences on states and legislative bodies. For Halliday the closure of markets might only be an issue during the early stages of professional development. In his analysis of the Chicago Bar Association, the preoccupation with market dominance was confined to early developmental stages and, once completed, its importance declined. In the later phase of 'established professionalism' the professional projects are different and a broader range of work is undertaken. Indeed, he (1987: 354) stated that 'if it can secure its occupational niche and protect its vital economic interests, then a profession's resources can be freed from market concerns for other causes'.

In general, then, some recent Anglo-American analyses of professions have involved the re-interpretation of the concept of professionalism as a normative value system in the socialization of new workers, in the preservation and predictability of normative social order in work and occupations, and in the maintenance and stability of a fragile normative order in state and increasingly international markets. This current interpretation has built on earlier (perhaps less critical) analyses but the result is now a more balanced and cautious reappraisal. There is due recognition, for example, of the power and self-interests of some professional groups in wanting to preserve and indeed promote professionalism as normative value system. This current interpretation of professionalism as value system involves a re-evaluation of the importance of trust in client/practitioner relations (Karpik 1989), of discretion (Hawkins 1992) as well as analysis of risk (Grelon 1996) and expert judgement (Milburn 1996; Trépos 1996). It also includes a reassessment of quality of service and of professional performance in the best interests of both customers (in order to avoid further standardization of service provision) and practitioners (in order to protect discretion in service work decision-making) (Freidson 1994).

2.2.3 Third Phase: Professionalism as a Discourse

A third development involved the analysis of professionalism as a discourse of occupational change and control – this time in work organizations where the discourse is increasingly applied and utilized by managers. This third interpretation is a combination of the previous two and includes both occupational value and ideological elements. Fournier (1999) considered the appeal to 'professionalism' as a disciplinary mechanism in new occupational contexts. She suggested how the use of the discourse of professionalism, in a large privatized service company of managerial labour, worked to inculcate 'appropriate' work identities, conducts and practices. She considered this to be 'a disciplinary logic which inscribes "autonomous" professional practice within a network of accountability and governs professional conduct at a distance' (1999: 280).

It is also the case that the use of the discourse of professionalism varies between different occupational groups. It is possible to use McClelland's categorization (1990: 170) to differentiate between professionalization 'from within' (that is,

successful manipulation of the market by the group e.g. medicine and law) and 'from above' (that is, domination of forces external to the group e.g. engineering and social work). In this interpretation, where the appeal to professionalism is made and used by the occupational group itself, 'from within', then the returns to the group (in terms of salary, status and authority) can be substantial. In these cases, historically, the group has been able to use the discourse in constructing its occupational identity, promoting its image with clients and customers, and bargaining with states to secure and maintain its (sometimes self) regulatory responsibilities. In these instances the occupation is using the discourse partly in its own occupational and practitioner interests but sometimes also as a way of promoting and protecting the public interest (e.g. medicine).

In the case of most contemporary public service occupations and professionals now practicing in organizations, however, professionalism is being constructed and imposed 'from above' and for the most part this means by the employers and managers of the public service organizations in which these 'professionals' work. Here the discourse (of dedicated service and autonomous decision making) is part of the appeal (or the ideology) of professionalism. This idea of service and autonomy are what make professionalism attractive to aspiring occupational groups. When the discourse is constructed 'from above', then often it is imposed and a false or selective discourse, because autonomy and occupational control of the work are seldom included. Rather, the discourse is used to promote and facilitate occupational change (rationalization) and as a disciplinary mechanism of autonomous subjects exercising appropriate conduct.

This discourse of professionalism is grasped and welcomed by the occupational group since it is perceived to be a way of improving the occupations status and rewards collectively and individually (e.g. aspiring caring occupations). It is a powerful ideology and the idea of becoming and being a 'professional worker' has appealed to many new and existing occupational groups particularly during the second half of the twentieth century (e.g. social work and social care occupations throughout Europe and North America).

However, the realities of professionalism 'from above' are very different. The effects are not the occupational control of the work by the worker/practitioners. Instead the emphasis is control by the organizational managers and supervisors (e.g. health and social care work). Organizational objectives, which are sometimes political, define practitioner/client relations, set achievement targets and performance indicators. In these ways organizational objectives regulate and replace occupational control of the practitioner/client work interactions, thereby limiting the exercise of discretionary decision-making, and preventing the service ethic that has been so important in professional work. Organizational professionalism is clearly of relevance to the forms of public management currently being developed in the UK, Europe, North America and more widely, in educational institutions (schools and universities), hospitals and primary care practices.

The appeal to professionalism can and has been interpreted as a powerful motivating force of control 'at a distance' (Burchell et al. 1991; Miller and Rose 1990). It is also effective at the micro level where essentially it is a form of inner-directed control

or self-control where close managerial supervision is not required – professional workers do not need supervisors. Organizational professionalism will be achieved through increased occupational training and the certification of the workers/employees – a process labelled as credentialism by Collins (1979, 1981). In these cases the appeal to professionalism is a powerful mechanism for promoting occupational change and social control.

But the appeal to the discourse by managers in work organizations is to a myth or an ideology of professionalism (Evetts 2003). The myth includes aspects such as exclusive ownership of an area of expertise, increased status and salary, autonomy and discretion in work practices and the occupational control of the work. The reality of the professionalism is actually very different. The appeal to professionalism by managers most often includes (i) the substitution of organizational for professional values; (ii) bureaucratic, hierarchical and managerial controls rather than collegial relations; (iii) managerial and organizational objectives rather than client trust and autonomy based on competencies and expertise; (iv) budgetary restrictions and financial rationalizations; (v) the standardization of work practices rather than discretion; and (vi) performance targets, accountability and sometimes increased political control.

The use of the discourse of professionalism as operationalized by managers in work organizations is also a discourse of self-control which enables self-motivation and sometimes even self-exploitation. Born (1995) illustrates this process in the work context of French professional music practice and it is present more generally in the work culture of artists, actors and musicians in general. Once self-defined as a professional artist, imposing time or other limits on one's efforts are rendered illegitimate. This is also the case with professionals in general. The expectations by self and others of the professional have no limits. For the professional, of all kinds, the needs and demands of audiences, patients, clients, students and children become paramount. Professionals are expected and expect themselves to be committed, even to be morally involved in the work. Hence managers in organizations can use the discourse of professionalism to self-motivate, inner-direct and sometimes to exploit professionals in the organization.

The analysis of professionalism has, then, involved different interpretations – sometimes positive, sometimes negative, and in the latest interpretation combined – of what the professionalization of an occupational group entails. The characteristics of occupational professionalism which made it distinctive and different to organizational means of controlling work and workers were somewhat idealistic (probably ideological) and based on a model and image of historical relations probably in the medical and legal professions in predominantly Anglo-American societies in the nineteenth century. The image was of the doctor, lawyer and clergyman, who were independent gentlemen, and could be trusted as a result of their competence and experience to provide altruistic advice within a community of mutually dependent middle and upper class clients. The legacy of this image, whether in fact or fiction, has provided a powerful incentive for many aspiring occupational groups throughout the twentieth century and helps to explain the appeal of professionalism as a managerial tool.

The image or the ideology of professionalism as an occupational value that is so appealing involves a number of different aspects. Some might never have been operational; some might have been operational for short periods in a limited number of occupational groups. The range of aspects include:

- control of the work systems, processes, procedures, priorities to be determined primarily by the practitioner/s;
- professional institutions/associations as the main providers of codes of ethics, constructors of the discourse of professionalism, providers of licensing and admission procedures, controllers of competences and their acquisition and maintenance, overseeing discipline, due investigation of complaints and appropriate sanctions in cases of professional incompetence;
- collegial authority, legitimacy, mutual support and cooperation;
- common and lengthy (probably expensive) periods of shared education, training, apprenticeship;
- development of strong occupational identities and work cultures;
- strong sense of purpose and of the importance, function, contribution and significance of the work;
- discretionary judgment, assessment, evaluation and decision-making, often in highly complex cases, and of confidential advice-giving, treatment, and means of taking forward; and
- trust and confidence characterize the relations between practitioner/client, practitioner/employer and fellow practitioners.

These aspects are not intended to be regarded as the defining characteristics of a profession. Rather these are aspects of the image and the ideology of professionalism which can account for the attraction and appeal of professionalism as an occupational value and increasingly as a managerial tool in work organizations. In previous publications I have referred to these aspects as ideal-types of occupational professionalism and contrasted these with organizational aspects of professionalism (Evetts 2006). But professionalism is changing and being changed. The next section examines some of the changes to the occupational value aspects of professionalism.

2.3 A New Professionalism? Changes and Continuities

Professionalism has undergone change and these changes have been seen as part of a governmental project to promote commercialized (Hanlon 1998) and organizational (Evetts 2006, 2009) forms of professionalism. Within this context Brint (1994) has discussed an epochal shift from the rhetoric of trusteeship to the rhetoric of expertise. Organizational principles, strategies and methods are deeply affecting most professional occupations and expert groups, transforming their identities, structures and practices. Whether a 'new' form of professionalism is emerging is debatable since there are elements of continuity as well as of change. It is important,

therefore, to clarify what exactly has changed and what continues in order to be able to assess the likelihood (or otherwise) of professionalism surviving as an occupational value.

Aspects of change certainly include elements of hierarchy, bureaucracy, output and performance measures and even the standardization of work practices, all of which are more characteristic of organizational rather than professional forms of occupational control. When service sector professionals have proved enduringly difficult to manage and resistant to change, then an important part of the strategy became to recreate professionals as managers and to manage by normative techniques. The discourse of enterprise becomes linked with discourses of professionalism, quality, customer service and care. Professionals are also tempted by the ideological components of empowerment, innovation, autonomy and discretion. Furthermore, attempts to measure and demonstrate professionalism actually increase the demand for explicit auditing and accounting of professional competences. Thus, managerial demands for quality control and audit, target setting and performance review become reinterpreted as the promotion of professionalism. It is necessary to recognize, however, that output and performance measures also represent a 'discourse of competition' (Hoggett 1996: 15) or what Broadbent et al. (1999) termed 'individualization'. The danger is that social cohesion and institutional action are undermined whilst competition threatens both team working and collegial support. Thus, the quest for professionalism and accountability is highly competitive and individualistic, but it is also a bureaucratic means of regaining and exercising control of a market-directed enterprise staffed by professionals.

In addition there are other characteristics (particularly the professionalism developed under the guise of New Public Service Management (NPSM)) which seem to point to a new and distinct variant of professionalism. The emphasis on governance and community controls, the negotiations between complex numbers of agencies and interests, and the recreation of professionals themselves as managers, are all examples of these variants. Thus, in public sector professions, control is increasingly achieved by means of normative values and self-regulated motivation. In professional services firms a discourse of enterprise is fitted alongside the language of quality and customer care and the ideologies of empowerment, innovation, autonomy and discretion. In addition, this is also a discourse of individualization and competition where individual performance is linked to the success or failure of the organization. These factors all constitute powerful mechanisms of worker/employee control in which the occupational values of professionalism are used to promote the efficient management of the organization.

In numerous ways centralizing, regulatory governments, intent on demonstrating value from public service budgets seem to be redefining professionalism and accountability as measurable. But before we acknowledge the decline (and possible demise) of occupational forms of professionalism, it is necessary also to acknowledge some of the ways in which occupational professionalism still continues to operate. Adler et al. (2008) argue that the market, hierarchy and community are not necessarily mutually exclusive but can be mutually supportive. More market pressures often lead to more community based practices such as multi-disciplinary

teams and cooperative working which are consistent with occupational forms of professionalism.

In addition the occupational control of work is still important in some traditional professions such as law (though less so for medicine). It is also of increased importance in some newly powerful professional groups such as international accountancy. The organization can provide new territories and opportunities for professionalization (e.g. management and personnel management) and there are examples of attempts by some occupational groups to reclaim professionalism. In these cases both national institutions and European professional federations are involved in aspects of the regulation of the occupational groups including the development of performance criteria, target setting and continuing professional development (CPD). In assisting governments to define and construct these regulatory systems, these national professional institutions and European federations are continuing to exercise occupational control over work whilst constituting a form of moral community based on occupational membership. In addition there are also examples of the sharing, modification and adaptation of particular regulatory regimes between different professional institutions and federations (Evetts 1994; Flood 2011).

Other continuities characteristic of occupational professionalism remain and seem resistant to change, sometimes despite clear policies and incentives for change. Gender differences in professional careers and occupational specialisms, continue, although some interesting variants are emerging and situations are complex. Women are entering established professions in larger numbers and proportions, and men are entering female professions, and many are successfully developing careers. Other professionalizing occupations (often where women are numerically dominant) have utilized professionalism in order to secure new tasks, responsibilities and recognition. Women are increasingly becoming managers, but management itself is being changed and standardized such that it might be the case that men are leaving this (less interesting and powerful) field and moving upwards where they can and sideways (e.g. into consultancy or private practice) when they cannot.

The following table summarizes aspects of change and continuity in the interpretation of professionalism as an occupational value in service professions. This is a simplification of what is, in fact, a highly complex, variable and changing situation. Professional occupations are different both within and between nation-states and contexts are constantly changing as new nation-state and European policies emerge, develop and are adapted and modified in practice and in local work places. Used with care and due caution, these aspects might enable an assessment of the prominence of organizational and occupational professionalism to be made in different occupations and work places (Table 2.1).

These changes and continuities include both structural and relationship aspects and characteristics, although, importantly, the changes are more structural while the continuities tend to focus on relations. In addition these changes and continuities have been identified and illustrated at macro (i.e. societal) and mezo (i.e. institutional/organizational) levels of analysis but there might also be significant micro (i.e. work place) variations in different places of work and local organizational contexts (Liljegren 2012).

Table 2.1 Changes and continuities in professionalism as occupational value

Changes	Continuities
Governance	Authority
Management	Legitimacy
External forms of regulation	Prestige, status, power, dominance
Audit and measurement	Competence, knowledge
Targets and performance indicators	Identity and work culture
Work standardization, financial control	Discretion to deal with complex issues, respect, trust
Competition, individualism, stratification	Collegial relations and jurisdictional competitions
Organizational control of the work priorities.	Gender differences in careers and strategies
Possible range of solutions/procedures defined by the organization	Procedures and solutions discussed and agreed within specialist teams

What, then, are the consequences for practitioners and clients? Is occupational professionalism worth preserving as a distinct alternative and contrasting way of controlling work and workers (compared with organizations and markets) and with value for both practitioners and their clients? What are the challenges and opportunities of changing aspects of professionalism as an occupational value?

2.3.1 Consequence and Challenges

The consequences of, and challenges to professionalism as an occupational value, are being documented by researchers interested in different occupational groups in Europe and North America (e.g. Bolton 2005; Bourgeault and Benoit 2009; Boussard 2008; Champy 2008; Dent et al. 2008; Schepers 2006; Wrede 2008;) and research links with sociologists of organizations are strengthening (Faulconbridge and Muzio 2008). There are also some early indications of what might be a retreat from or a substantial redefinition of certain aspects of managerialism and New Public Service Management (NPSM) by policy-makers in respect of some service work (e.g. Dahl and Hanne 2008). There is, as yet, no established causal link between the organizational changes and challenges to occupational professionalism and a deterioration of professional values so, as yet, any linkage remains speculative. Also there are several complicating factors which make a causal link difficult to establish. Complicating context factors (some general, some nation-specific) include the demystification of aspects of professional knowledge and expertise; cases of practitioner malpractice and ‘unprofessional’ behaviour; media exaggeration and oversimplification; political interference; large fee and salary increases in particular professional sectors; and divisions between commercial (corporate clients) and social service (state-funded) practitioners; increasing trade union activism on behalf of professionals; all of which carry a perception of self rather than public interest.

It is also the case that powerful professionals have often been resistant to managerial intervention and organizational controls. Many organizations in the public services (e.g. hospitals and universities) are complex professional bureaucracies (Mintzberg 1983) characterized by the involvement of a number of different professional groups. These groups have a history of relative autonomy over their working practices and often have high status which gives them both power and authority. In addition, the 'outputs' of these organizations (and the professionals in them) are not easily standardized and measurable. When the ability to define and standardize the nature of the work process is limited, and the definition of the outputs of the work (and what constitutes success) is problematic, then such service work would seem to be unsuitable for both market and organizational controls.

A decline in occupational professionalism and the possible expansion of organizational forms of professionalism is, then, one of a number of complicating factors (also see an alternative interpretation in Adler et al. 2008). It can be stated, however, that organizational techniques for controlling employees have affected the work of practitioners in professional organizations. The imposition of targets in teaching and medical work – and indeed for the police (see Boussard 2008) – have had 'unintended' consequences on the prioritization and ordering of work activities, and have brought a focus on target achievement to the detriment or neglect of other less-measurable tasks and responsibilities. Bureaucracy, increased regulation and form filling take time which might arguably be devoted to clients. The standardization of work procedures, perhaps using software programmes, is an important check on the underachieving practitioner but can be a disincentive to the creative, innovative, and inspirational professional.

It is important to remember also that the way professionals regard their service work and their working relationships are also being changed and this is an important consequence of redefining the occupational value aspects of professionalism. An emphasis on internal as well as external markets, on enterprise and economic contracting, are changing professionalism. In tendering, accounting and audit management, professionalism requires practitioners to codify their competence for contracts and evaluations (du Gay and Salaman 1992; Freidson 2001; Lane 2000). 'Professional work is defined as service products to be marketed, price-tagged and individually evaluated and remunerated; it is, in that sense, commodified' (Svensson and Evetts 2003: 11). Professional service work organizations are converting into enterprises in terms of identity, hierarchy and rationality. Possible solutions to client problems and difficulties are defined by the organization (rather than the ethical codes of the professional institution) and limited by financial constraints. The role of organizations as institutional entrepreneurs has also been identified and includes the lobbying of the state by professional institutions in order to change professional regulation in their favour.

The commodification of professional service work entails changes in professional work relations. When practitioners become organizational employees then the traditional relationship of employer/professional trust is changed to one necessitating supervision, assessment and audit. Relationships between professionals and clients are also being converted into customer relations through the establishment of

quasi-markets, customer satisfaction surveys and evaluations, as well as quality measures and payment by results. The production, publication and diffusion of quality and target measurements are critical indicators for changing welfare services into a market (Considine 2001). The service itself is increasingly focused, modeled on equivalents provided by other producers, shaped by the interests of the consumers and increasingly standardized. The increasing focus on marketing and selling expert solutions (Brint 1994) connects professionals more to their work organization than to their professional institutions and associations. Clients are converted into customers and professional work competencies become primarily related to, defined and assessed by, the work organization.

2.3.2 Opportunities

The challenges to professionalism as an occupational value seem numerous but are there any opportunities associated with these changes which might improve both the conduct and the practice of professional service work and be advantageous for both practitioners and their clients? Are there some advantages in the combination of professional and organizational logics, of hybrid organizations and organizationally located professional projects, for controlling work and workers?

Using the list of changes and continuities already identified, it would seem important to try to retain some form of occupational control both of work processes and relations. All aspects would need evaluation and assessment by research but it is possible to argue that identity, work culture, specialist team working, discussions among specialists, knowledge and expertise formation and its maintenance all improve the conduct of professional work and its practice while being of benefit to both practitioners and their clients. Other items apparently of importance to organizations would seem to be of less relevance and indeed to have a detrimental affect on professional control of their work. These include auditing measurement, targets and performance indicators. In several instances, these aspects have been shown to distort work processes, procedures and work priorities producing 'unintended' consequences for practitioners and clients. Other aspects of organizational change, including credentialism, governance and external forms of regulation, would seem to produce some benefits (for example of transparency and control of more extreme professional powers) while, at the same time, resulting in detrimental effects such as increased bureaucracy, form-filling and paper-work. These all take time which, arguably, could be better spent in client contact and service work as defined by the profession itself rather than by the work organization. These aspects would seem to have benefits and costs, therefore, and their appropriateness for professional work would need to be monitored over time.

There are other opportunities which might prove to be more beneficial from the combination of the logics of professionalism and the organization which might prove advantageous. One of these is the incorporation of Human Resource Management (HRM) from the organization into professional employment practices,

processes and procedures. Job contracts, job descriptions, formal interview and selection procedures, employment rights and benefits, appeals procedures, sickness benefit and cover, maternity, caring and other absences, are all examples which have benefited the majority of professionals working in organizations and have for the most part replaced less formalized social networking and informal recommendation procedures. Indeed, human resources procedures have contributed to the spectacular growth in professional employment over the last 20 years and have improved diversity and equal opportunities.

Standardization and formalization of selection, retention and career development procedures have also increased the transparency of what were often hidden, even 'mysterious' arrangements in respect of promotion, career progress and departmental relationships and links within the organization. Less formalized procedures benefited only a select few privileged practitioners and were perceived as unfair and inequitable by the majority. Increased transparency can then result in more emphasis on career choices, dependent on personal circumstances, rather than the sponsorship of the privileged few. Career inequalities clearly continue (including in respect of gender and ethnicity), as well as some reliance on networking, informal advice and recommendations but, in general, the incorporation of HRM procedures and regulations from the organization into professional employment practices have been an opportunity and of benefit for practitioners and their work.

Other opportunities would seem to be explained by the increased recognition that organizational management and managerialism is not only complex but is also multi-layered and multi-dimensional. Management is being used to control, and sometimes limit, the work of practitioners in organizations but, in addition, management is being used by practitioners and by professional associations themselves as a strategy both in the career development of particular practitioners and in order to improve the status and respect of a professional occupation and its standing.

As a micro-level strategy, there is some evidence, particularly from health professionals such as nursing and midwifery (Carvalho 2008; Bourgeault et al. 2004) but also now from medical doctors (Kuhlmann 2008) and teachers (Gewirtz et al. 2009), of individual practitioners acquiring qualifications in management (e.g. the MBA or other professional doctorates) with the clear intention of furthering their careers. In the case of health professionals, such as nurses and midwives, this can also be interpreted as a collective mobility strategy as increasingly hospital management at middle and senior levels is perceived as a career opening for those with appropriate management credentials, experience and motivation.

As a mezo level strategy, it is also interesting to note the work of Langer (2008) in respect of social work in Germany. Masters level programmes for social workers in Germany are incorporating management training as a way of increasing the status, standing, reputation and respect for social work as a professional occupation in the field of social services work. Following European Union attempts to standardize higher education levels in Europe, in Germany there is a large development of Masters programmes which qualify (in this case) social workers to apply for leadership positions in non-profit organizations and social services departments. These

developments can be interpreted, therefore, as both micro and mezo level strategies in respect of social work.

In addition, organizations can constitute sites for (and objects of) professional control and domination. Jurisdictional disputes and negotiations were originally described by Abbott (1988) but now they are being played out within organizations rather than in the wider arena of labour markets and education systems. Within organizations, occupations seek to process and control tasks and task divisions to suit their own occupational interests. The medical profession can continue to use its cultural authority and legitimacy to maintain dominance (Coburn 2006; Freidson 2001; Larkin 1983) but other professionals need to use competition, particularly in respect of competences, to acquire dominance in decision-making in the organization. Armstrong (1985) describes competition between professionals in management (accountancy, engineering and personnel) in colonizing key positions, roles and decision-making within large organizations. In these ways organizations constitute arenas for inter-professional competitions as well as professional conquests.

2.4 Policy Relevance, Assessment and Evaluation

In this section I identify some of the important contributions made by researchers on professional work to public policy developments, assessment and evaluation. The idea of professionalism as an occupational and normative value can be linked with public policy concerns about competences at all levels of occupational work.

In the field of sociology of professional groups a number of policy initiatives have been examined by researchers producing reports for policy-makers at both nation-state and regional (European) levels. Health policies particularly in respect of occupations in medicine, nursing, midwifery and alternative medicine and the regulation of these groups of workers have been of interest and have been debated and discussed by researchers. Discussion has also focused on changing modes of governance and of how best to administer professional groups and, in particular, the significance of managerialism and of organizations in public sector social service work (e.g. teaching and social work). Policies focused on recruitment and retention of key groups of service-sector workers, as well as issues to do with migration for both exporting and importing countries and their practitioners, have featured strongly in recent discussions and publications.

Professional work is generally perceived to be service-sector and essentially knowledge-based and where practitioner expertise and experience, both substantive and tacit, are valued and rewarded. The education and training of such practitioners, their credentialing and sometimes their licensing, and continuing professional development, are also policy-relevant issues. The production and certification of expertise, and the promotion of abilities to make expert judgments and assessments in highly complex cases, are regarded as extremely important in all occupations and professions. Yet these abilities are difficult to promote and encourage other than by means of long and expensive education, training and apprenticeships. Most of these

apprenticeships are, of necessity, perceived as vocationally specific. However a recent European focus on work and workplace competences seems to be attempting a more general focus (see Pavlin et al. 2010). Policy initiatives in respect of competences and where these are best facilitated and developed (e.g. in education, higher education or in work) are currently of interest to policy-makers and governments. In Europe, the Bologna Accord (which focused on educational mobility in Europe) and subsequent developments (e.g. in Lisbon) are also encouraging the standardization and regularization of higher education credentials and levels in order both to encourage mobility within the European Union as well as to promote higher education itself as a marketable commodity in international markets.

There are a number of other policy-relevant issues and questions in need of attention as systems of higher education expand and the numbers and proportions of educated individuals increase world-wide. Some of these can be listed and are being discussed by researchers in the field of sociology of professional groups. Examples include the following: what are the connections and linkages between the concepts of expertise, competence and professionalism? In the context of mass academic certification, the certified individual is not necessarily an expert whose judgment can be relied on to take decisions. Is trust in professionals worth preserving? Is professionalism as an occupational value worth protecting and promoting, and even expanding to all kinds of occupational work and workers? Are we able to define and categorize the notion of occupational competence and how do the different discourses of employers, managers, workers and customers vary in respect of how competences are perceived? If the occupational values of competences and professionalism are linked and worth promoting then in which institutional locations and stages of career are these best developed – in educational institutions such as schools and universities, in workplace organizations, or in vocational and training courses separate from schools and work? What is the function and purpose of professional institutes and associations? Are these of value and importance, and worth promoting and developing in societies where none have existed? Alternatively have these institutions become too powerful in closing markets and protecting jurisdictions from competition and other market effects? Where are the ethical dimensions of work and occupations best developed and maintained? Are customer complaints a good measure or indicator of the extent of professionalism in the workplace? Is the occupation (via its institute, guild or association) the best regulator of the work and workplace practice?

In general, then, service-sector occupations and knowledge-based work are increasingly seen to be marketable products in the global economy. Knowledge-based occupations are also the expanding employment categories and the growth sectors of labour markets particularly in developed societies but also in transitional and developing economies. Professions are essentially the knowledge-based category of occupations which usually follow a period of tertiary education and vocational training and experience. A different way of categorizing these occupations is to see them as work associated with the uncertainties of modern lives in risk societies. Professional workers are extensively engaged in dealing with risk, with risk assessment and, through the use of expert knowledge, enabling customers and

clients to deal with uncertainty. Sociologists of professional groups are increasingly involved in the evaluation and assessment of risk in social and public policy.

In conclusion, this chapter has explained professionalism as an occupational value and argued the importance of retaining and perhaps recreating this interpretation for service sector professional and occupational work. But professionalism is changing and being changed as service professionals now increasingly work in large-scale organizational work places and sometimes in international professional firms. The chapter examined the changes to and the continuities in the construction of professionalism in these organizational contexts. Also examined were some of the changes and challenges to professionalism as an occupational value as well as some of the opportunities for practitioner-workers and their clients in service work. It is important to remember that the redefinition of professionalism and its links with management present opportunities and benefits for professional work and workers as well as important challenges. Perhaps continuities, challenges and opportunities, for the maintenance of professionalism as an occupational value is one of the most important tasks for professional institutions and for governments over the next few years. Professionalism as an occupational and normative value is arguably fundamental for professional work, professional practice and learning.

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Chapter 3

Moral Aspects of Professions and Professional Practice

Gerhard Minnameier

Abstract Professions are usually defined as occupations that require expert training at an academic level and are built on a set of standards that have to be met by members of a given profession. These standards not only apply to certain kinds of expert knowledge that are expected of professionals but also ethical standards in relation to the usage of this expert knowledge. However, apart from possible failures to meet these requirements, professionals, like anybody else, normally do not always act according to one guideline alone. Their actions are rather tuned to different situational cues. The article explores what kind of situations can be distinguished on a theoretical basis, how far such differentiations are acceptable or even appropriate and where they are not, and how situational adaptation works. The paper ends with deriving implications for professional practice and vocational education and training.

Keywords Professional ethics • Business ethics • Moral development • Developmental stages • Situation specificity • Moral functioning • Moral motivation

3.1 Introduction

Professions are usually defined as occupations that require expert training at an academic level and are built on a set of standards that have to be met by members of a given profession (Abbott 1988, 1991; Freidson 2001). These standards not only relate to certain kinds of expert knowledge, but also to ethical guidelines and principles. And the more professionalised a certain area is, the more difficult it is for their social environment (e.g. customers and clients) to know what is best for them and

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what is morally appropriate. Think, e.g., of the medical and judicial professions, where clients have to rely on the professionals' honesty and integrity.

However, today ethical codes also apply to lower ranking professionals and, in fact, to all staff of a company or organisation. The reason behind this is that autonomy and responsibility have become key elements in the modern organisation of work, and with more autonomy of the personnel the moral responsibility also increases. This not only includes the problem of furthering one's own interests – staff theft or disengagement at work – but also the issue of conflicts of loyalty to the company and to the customer, or conflicts between seeking the company's benefit and social or environmental concerns.

Apart from particular moral problems that may arise in specific areas – e.g. security issues for those in the airline industry; biotechnological aspects in health professions and so on – all professionals have the problem of mediating between their professional aims and duties on the one hand, and their personal views and values on the other. Furthermore, with respect to social and environmental concerns and other stakeholder interests, there is no clear dividing line between the professional and the private point of view, since stakeholder management and corporate social responsibility have become key areas of business management (see e.g. Freeman et al. 2004) and since the proper understanding of the social responsibility of a profession is also a key element of the very idea of professionalism (see e.g. Abbott 1988; Beck 1997; Kutscha 2008; Parsons 1968).

Professional identities can take three forms: undifferentiated, segmented, and integrated (Nyström 2009). According to Nyström, these forms constitute a developmental sequence, beginning with an undifferentiated identity, where the (previously formed) personal identity is transferred to the professional life. Segmentation means that a new and separate professional identity is formed, so that the individual has two different identities: one professional, one private. At the final stage, the personal and the professional identity are integrated.

However, it is still an open question whether professional and personal identities can always be integrated and how an integrated identity would work, especially with respect to ethical issues. There is ample evidence today, both from research in moral psychology (see Krebs and Denton 2005, for an overview) and in business ethics for situation-specific moral judgement and action (see e.g. Church et al. 2005; Forsythe et al. 1994; Greenberg 2002; Hoffman et al. 1994; Johns 2001, 2006; O'Fallon and Butterfield 2005; Ross and Robertson 2000; Schminke and Priesemuth 2012; Tenbrunsel and Smith-Crowe 2008; Treviño et al. 2006). It is widely accepted today, that moral judgement and action are adapted to situational affordances and constraints, so that there is a great deal of situation-specificity in moral functioning. However, it is not only unclear, how this situational adjustment actually functions, but also, whether it should be welcomed as flexible and intelligent adaptation or condemned as opportunistic orientation and trimming one's sails to the wind.

Whether one view or the other is correct will depend on the way in which situation-specificity comes about and is handled by the individual. As already mentioned above, one possibility is segmentation or separation, so that the individual lives in different worlds with different principles and action-orientations for a critique of the so-called separation thesis (see Wicks 1996, see also Sandberg 2008;

Harris and Freeman 2008; conversely Bragues 2005). The other possibility is a specific problem orientation, so that situation-specificity depends on specific types of problems that evoke specific moral principles and reactions that are suited to master that situation. The former is the more problematic interpretation implying some kind of split personality. The latter relates to the positive view of an integrated identity that allows for suitable differentiations in moral functioning.

To determine which view ought to be endorsed, I will first consider the types of problems that professionals may encounter and what conflicts these problems may induce with respect to the differentiation of a personal and a professional identity (Sect. 3.2). It will also be discussed what kind of moral principles are suitable to deal with the respective problems, and it turns out that quite different stage principles seem to be appropriate in different situations. Therefore, I will attend to the processes of moral functioning in Sect. 3.3 and discuss an inferential approach which yields an extended view of the processes of moral judgement. According to this analysis much of what we perceive as situation-specific adjustment follows a coherent logic, indeed, which speaks against the idea of simple segmentation and also against the widely-held view that heterogeneous moral orientations are to be equated with insufficient moral motivation in certain situations. As most scholars not only consider situational factors but also personal factors to be relevant for determining moral action orientation, a section on the moral self and its role in moral functioning is also included (Sect. 3.3.3). Finally, in Sect. 3.4, implications for professional practice and vocational education and training will be discussed.

3.2 Moral Problems and Solutions in the Context of Professional Practice

3.2.1 Moral Problems at Work

Moral problems at work arise at all levels and for both employees and entrepreneurs (see e.g. Crane and Matten 2010; Clarke and Holt 2010; Ferrell et al. 2008; Hannafey 2003; Harris et al. 2009; Heinrichs et al. 2014; Valentine and Hollingworth 2012). Moral conflicts arise, because individuals have quite different responsibilities and interests which may coincide, but which may also conflict. In their role as employee or entrepreneur they have to act in the interest of their company or business. As members of professions they are also committed to ethical codes or standards of their profession. As experts in their professional activity, they are indebted to their customers or clients who (have to) trust them. As human beings, they have friends, relatives and their families whom they have to care for. And as members of society they will also be concerned about broader social and environmental issues. Last but not least, their duties may also conflict with their valid self-interest, which also constitutes an important and perhaps neglected moral problem (Maitland 2002).

The company's interest is violated in all cases of employee theft and company-related fraud, but also if staff merely work to rule and do not really care for doing a

good job. In this respect, therefore, one has to be committed to the company as such (i.e. as a social whole) rather than merely following one's self-interest and being motivated only by avoiding punishment, by prospects for better pay and promotion.

Professional standards may be violated for personal reasons or for the sake of the company in order to make an extra profit or to save costs. Therefore, people in the medical professions commit themselves first of all to the well-being of their patients. Engineers should put safety and proper work first in order to prevent accidents and damages. Advertisers ought to extol goods, but not to deceive consumers. Financial advisors direct their clients to comparatively high returns, but they also have to inform them about the risks they run when investing their money in a particular way. By the same token it is important for all professions that their members keep to the standards and act within ethical boundaries, because otherwise the profession itself could fall into disrepute.

Issues of *valid* self-interest, e. g., are questions of how one's work is rewarded (especially, how it is remunerated), and how far one has to be indebted to the company (when it comes to helping out or working for the company in one's free time). However, not only the employee can be the victim, but also the employer. Consider the case of junior employees who are offered 2-year specialised training and then receive tempting job offers at the end of this period. On the one hand, they have benefited from the employer's investment, yet, on the other hand, it could also be argued that they have to seize such opportunities.

As a consequence, there are what economists call "moral hazards" on all sides. Customers as well as one's own company may be deceived and professions as a whole may be discredited by what they consider 'immoral' members of a profession and dishonest behaviour. Moral hazards are based on information asymmetries, and these typically increase with the level of professionalisation of a certain field. Such hazards arise where so-called principals engage agents for some kind of task, and where agents have information that they might conceal to the detriment of the principal. Think of employees whose employer does not know how much effort these employees actually put into their work. Or, consider a seller of used cars (agent) who knows more about a car's actual condition than the customer (client) (see Mankiw 2011, 468–473, for an overview).

Thus, on the one hand, professionals have to meet many moral requirements in a wide variety of contexts. They have to have the necessary moral understanding and motivation, and they have to be sensitive to situation-specific demands. On the other hand, however, they also have to be aware of the moral hazards they face, especially when their morality is likely to be exploited. Therefore, types of situations and (moral) means to handle them, are of great importance for adequate moral functioning.

3.2.2 *A Taxonomy of Types of Situations*

As explained above, situations differ in terms of who is concerned and what is at stake. Apart from different types of groups or individual functions, however, we can also distinguish different kinds of moral tasks. For instance, a team of young

Table 3.1 Description of the four stage-related types of situations according to Beck

Situation (stage)	Description
<i>Competition (Stage 2)</i>	Competitive situations are marked by a clash of interests in which one either has to pursue one's own (or one's company's) interests or engage in negotiations in order to strike a deal and stick to that in the mutual interest of the parties involved.
<i>Cooperation (Stage 3)</i>	In cooperative situations people have to be aware of the social roles they play or have taken on and have to consider what is best for their group, their family or their company.
<i>Coordination (Stage 4)</i>	In the larger context or where group orientations and role expectations conflict, one has to rely on generally agreed (especially democratically established) rules like laws and other regulations.
<i>Constitution (Stage 5)</i>	Constitutive situations are about inventing or setting rules for coordination. As such, these situations require a prior-to-society perspective and principles according to which laws can or should be made.

entrepreneurs may have to convince their bank to give them a loan and, therefore, conceal some disadvantageous information. Or, job applicants put themselves in very positive light, or a salesperson does not inform a customer about a slight defect of the desired product. All these actions are motivated by self-interest, so they are all of one type, irrespective of the specific context.

However, a quite different kind of moral problem arises when a manager of a middle-sized firm stresses the team character of the company, or when employees have to cooperate to determine who goes on holiday when or how to split up a complex order into small work packages. Whereas the issues mentioned first are situated in a framework of *competition*, those latter issues focus on *cooperation*. Beck (1999, 2008) has made this distinction and added two more types: *coordination* and *constitution*, which he also matches with specific Kohlberg stages (see Table 3.1). On his view, Stage 2 is appropriate for competitive situations, Stage 3 for cooperative situations, Stage 4 for problems of normative coordination, and Stage 5 for constitutional situations. *Coordination* in his understanding means that larger social entities that consist of concrete groups (of people how know each other, work or live together) have to coordinate their activities based on established and accepted procedures or by democratic decision-making. The organisation of a larger company is one example, deciding where to best build a certain road and other questions concerning infra-structure are another. *Constitutional* situations go even beyond mere coordination, because they concern the establishment of coordinative rules and procedures in terms of guiding principles (e.g. in the sense of a Rawlsian social contract).

Thus, the four categories described in Table 3.1 constitute very general types of situations, which differ from each other in that each requires a specific kind of moral reasoning in terms of 'Kohlberg stages'. However, this also means, contrary to Kohlberg, that the highest (or a higher) stage is not always appropriate. Rather, if situations belong to a certain type, they have to be matched with the respective moral stage principle.

As the examples already suggest, the four different types characterise *abstract* modes of social interaction that may appear in different *concrete* contexts, so that competition, cooperation, coordination, and constitution may all be relevant for the internal interaction among members of a company, the relations with customers and suppliers and with society as a whole. This extended view yields the two-dimensional classification of situations shown in Table 3.2. The single cells contain examples of concrete problems representing the categories. For instance, *competition* appears in personal relations within the company, in the interaction between the company (or its members) and customers or suppliers, and as a principle of interaction on the level of society as a whole (where, e.g., tax-payers try to keep their personal burden low even though they accept taxation as such for the society). The examples also show that issues of all stage-related types can be found in all of addressee-related types (in the lines of Table 3.2).

Depending on one's position and tasks, some of these moral aspects are more relevant, others less. However, to some extent they will play a role in the professional lives of virtually anyone, because everyone is part of a social system – indeed, various social systems that may also be embedded into one another. Therefore, every employee and every employer can perceive their roles and actions from different moral points of view. What these points of view are, and how they may become relevant in actual practice, is perhaps better understood within a neo-Kohlbergian framework of moral stages that I will sketch in the following section.

3.2.3 A Neo-Kohlbergian Taxonomy of Moral Stages

As far as the Kohlberg stages are concerned, they have long been criticized for their vagueness and their weak systematic foundation (see e.g. Tomlinson 1986; Gibbs 2010). However, these deficiencies might have been overcome with a neo-Kohlbergian taxonomy which is more detailed and theoretically more stringent (see Minnameier 2000, 2001, 2005, 2009, 2010a, b, c). Kohlberg's theory may work as makeshift to some extent. However, when it comes to the problem of situational adaptation, it is no longer appropriate, as will become apparent further below. The neo-Kohlbergian taxonomy can enhance our understanding of morality related to the different contexts, and it also accommodates much of what is in the Kohlberg model, e.g. his idea of A- and B-types of each stage (Kohlberg differentiated A- and B-types; the neo-Kohlbergian taxonomy distinguishes three substages, A, B, and C, for each stage).¹

The neo-Kohlbergian taxonomy (see Fig. 3.1) is based on a dialectic developmental theory that was originally suggested by Piaget and Garcia (1989). According to their

¹ Kohlberg first introduced these forms as “sub-stages” (see e.g. 1984), but played them down later and spoke of “types”, because he noticed anomalies in the developmental sequence (Colby and Kohlberg 1987). From the point of view of the neo-Kohlbergian taxonomy, however, these anomalies are integrated and therefore constitute no systematic problem anymore.

Table 3.2 Types and examples of moral issues

Addressee-related types	Stage-related types			Constitution
	Competition	Cooperation	Coordination	
<i>Company</i>	Conflicts of interest between employer and employee	Teamwork; company loyalty; living up to one's concrete role in the job	Respecting organization and internal procedures	Discussing the company's philosophy and human relations
<i>Customer/supplier</i>	Buying and selling	Friends/relatives as customers/suppliers; regular customers	Securing customers' /suppliers' legal rights	Developing consumer protection
<i>Society</i>	Business in a market economy; the individual as tax payer	Cooperation in industrial associations;	Complying with existing rules on wage negotiations with unions	Developing regulations for sustainable production

Levels	I						II						III																	
Stages	1			2			3			4			5			6			7			8			9					
Substages	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

Fig. 3.1 Overview of the neo-Kohlbergian stage taxonomy

approach development proceeds across the dialectical triad of intra-, inter-, and trans-stages. “Intra” means that certain claims (of individuals or groups) are recognised as such, but can as yet not be balanced in a principled way. Consider the relevance of personal interests. According to Kohlberg, people at Stage 2 realise that everybody has interests to pursue. Thus, interests of others are recognised and accepted (this is Stage 2A in the neo-Kohlbergian framework).² However, when interests clash, everybody just has to pursue his or her own personal interest.

At the “inter”-stage, however, it is possible to mediate between those interests, especially through mutual agreements (promises or contracts), by which the different interests are matched in such a way that an agreement is reached and accepted by both parties. This type of moral reasoning also belongs to Kohlberg’s Stage 2, although it is quite different from the first type. It is labelled Stage 2B in the present framework.

Eventually, at the “trans-stage”, one may even go beyond negotiating exchange values, when one becomes aware of the fact that sometimes you are forced into unjust and disadvantageous deals. This is possible in the sense of the Golden Rule (in its simplest form), where one considers the others’ and one’s own interests from an outside perspective (Stage 2C). This kind of thinking plays an important role when salespersons act in favour of the customers and at the expense of their own or their company’s profit, because they are considerate and value the customer’s interest as such, not just strategically. According to Kohlberg’s taxonomy this reasoning would already belong to Stage 3. However, it still takes place in the context of dealing with conflicting interests, whereas the neo-Kohlbergian Stage 3 relates to the perspective of a social whole like e. g. taking the perspective of one’s company or one’s department.

This differentiation within – broadly speaking – the entire “Kohlberg-stages” thus covers important additional aspects of how to suitably address different moral problems at work. For reasons of brevity I cannot go into more detail here, but the examples given will suffice to give the reader an idea of what kinds of different moral principles may be relevant in specific situations (for additional examples and explanations see Heinrichs et al. 2014).

²In some earlier presentations of the taxonomy the stages were called levels and numbered only 1–3 recursively (following the hierarchically integrated dialectical structure; see Minnameier 2000). However, in order to make the main relations to Kohlberg’s stages more salient, they are numbered 1 through 9 here. This also indicates that there are forms of ethical reflection that are not included in Kohlberg’s stages at all and that go beyond his framework (for more details and the explication of stages and differences to Kohlberg’s view see Minnameier 2000, 2001).

In this section, it has been shown, how forms or moral reasoning are connected in terms of higher complexity, where higher stages solve the problems that appear at the lower ones. Based on this, the next section explores how moral stages are used in situations, according to the level of complexity as it is perceived.

3.3 Moral Functioning and Situational Adjustment

3.3.1 *Situation-Specific Adaptation*

Today, there is hardly any doubt that professional morality has to do justice to the specificity of situations rather than lumping everything and everyone together under one “cure-all” moral principle. Many have claimed this (quite recently) in business ethics (Church et al. 2005; Crane and Matten 2010, 160–176; Greenberg 2002; Johns 2001, 2006; O’Fallon and Butterfield 2005; Schminke and Priesemuth 2012), and moral psychologists have produced impressive empirical evidence of situation-specific variability of moral judgement (for an overview see Krebs and Denton 2005; see also Beck et al. 2002; Beck and Parche-Kawik 2004; DeScioli and Kurzban 2013). Following Krebs and Denton (2005) I also believe that while people acquire increasingly sophisticated structures of moral reasoning in the course of their development, they “retain their old forms of moral reasoning and invoke them to solve the problems that they are equipped to solve. Simple problems can be solved perfectly adequately with simple forms of thought” (2005, 673). The question, however, is what kinds of situational adaptations are appropriate and how they are to be explained. The latter question will be addressed in this section, and I shall discuss the former in the following section.

Situation specificity has long been a problem for moral psychologists, Firstly, Kohlberg has always held that moral stages are structured wholes that include and transcend the stages below them so that the highest reached stage is always the best one and is used in any situation (see e.g. Colby and Kohlberg 1987, 6–8; Lapsley 2006). Secondly, the deviation from a moral judgement has been interpreted as a lack of moral motivation (esp. by Rest 1983, and subsequently in the research on the so-called “happy victimizer phenomenon”; see e.g. Nunner-Winkler 2007; Nunner-Winkler and Sodian 1988; see also Minnameier 2010b, 2013). Similarly, Kohlberg and Candee (1984) have employed Blasi’s (1983) concept of “judgements of responsibility” to address this problem and held that by way of those judgements individuals have to commit themselves to what they have already identified as their moral duties (see Fig. 3.2).

Given this, attuning one’s decisions and actions to the affordances and constraints of different situations arouses the suspicion that one just lacks moral motivation (or moral responsibility, with respect to Fig. 3.2) to live up to one’s duties, being self-righteous and trimming one’s sails to the wind. However, if situational adaptation is taken seriously, as something that is positive and even required of

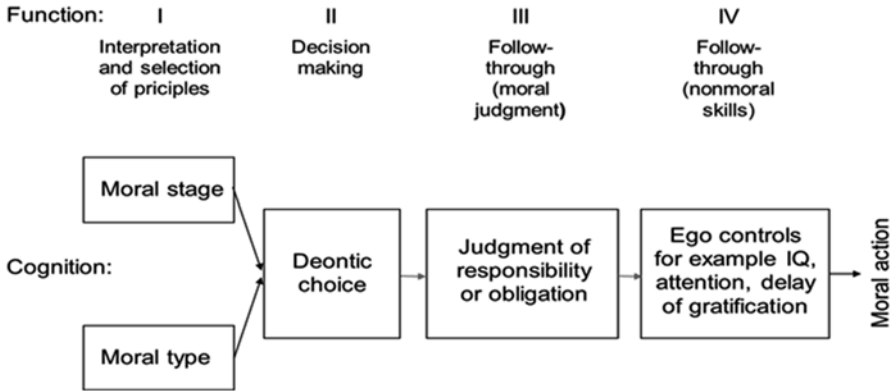


Fig. 3.2 Model of the relationship of moral judgment to moral action (Kohlberg and Candee 1984, 71)

professionals, we have to reinterpret the processes of moral functioning as modelled by Kohlberg and Candee (1984) and by Rest (1983, 1984; also Rest et al. 1999).

This is all the more important, because moral motivation and moral responsibility have not only been discussed with respect to moral function in everyday situations, but have also been championed in the field of business ethics where, however, Rest's four-component model became embedded into a larger model including also so-called person-situation interaction (see e.g. Crane and Matten 2010, 143–145; Ferrell and Gresham 1985; Hunt and Vitell 1986; Jones 1991; Treviño 1986; Treviño et al. 2006).

Criticism of the Restian view of moral motivation is based on systematic reasons, i.e. problems with the very notion of moral motivation (Minnameier 2010a, b, c, 2013) and the already mentioned influence of situational factors on top aspects of the moral personality (Crane and Matten 2010, 143–145), e.g. that one and the same person cooperates in one team, but refuses to cooperate in another team, where freeriding prevails. I will not go into the criticisms here, but rather explain how the logic of situational adaptation might work, based on an inferential approach which distinguishes between abduction, deduction, and induction. In the subsequent section, I will discuss how personal influences might come into play.

3.3.2 *Inferences and the Explanation of Situational Differentiation and Adaptation*

Rest's four-component model of moral functioning distinguishes between 'moral sensitivity', 'moral judgment', 'moral motivation', and 'moral character' (see Rest 1983, 1984; Rest et al. 1999). According to this model, there is obviously only one distinctively cognitive component: *moral judgment*. The other processes are

thought to frame, process, possibly distort or suppress this cognitive activity or its outcome.

While Kohlberg and Candee's (1984) model looks similar on the surface, there are marked (and remarkable) differences between them. In particular, Rest clearly divorces moral judgement from moral motivation (see also Rest 1983, 564; Rest 1984, 27, 32), whereas Kohlberg and Candee "hypothesize that there are two distinguishable but related modes or kinds of moral judgment" (1984, 56). In their view, moral judgment as a whole is divided up into two parts, a deontic judgement and a judgment of responsibility (see *ibid.*, 57). On top of this, the first step according to Kohlberg and Candee consists in activating a suitable stage-principle based on the situational input. All this suggests that "deontic choice", the second step in their model, is but one cognitive process which is sided by additional cognitive processes.³

In particular, it can be argued that the overall process of moral judgement splits up into three distinctive types of judgment or inferences that cover the first three processes of Kohlberg and Candee's (1984) model. These inferences can be distinguished and explicated in the framework of C. S. Peirce's approach to scientific reasoning, which is discussed and applied, today, in different disciplines contexts (see e.g. Aliseda 2006; Campos 2011; Gabbay and Woods 2005; Magnani 2009; Minnameier 2004a, 2010c; Schurz 2008).

Peirce (1903/1934) goes beyond the classical distinction of *deduction* and *induction* and introduces a third type of inference called *abduction*. On his account, and opposed to the classical view still common in today's common sense understanding, induction cannot produce any new items of knowledge but only establish a conviction about the factual truth (in the pragmatist sense). In Peirce's own words, the inferences are described as follows:

Abduction is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis. Deduction proves that something *must* be; Induction shows that something *actually is* operative; Abduction merely suggests that something *may be*. Its only justification is that from its suggestion deduction can draw a prediction which can be tested by induction, and that, if we are ever to learn anything or to understand phenomena at all, it must be by abduction that this is to be brought about. (Peirce 1903/1934, 106 [CP 5.171])

These three inferences constitute a dynamic and recursive structure illustrated in Fig. 3.3. *Abduction* begins with a situational problematic that needs to be addressed by some theory. The problem can be explanatory (this is the common framing), but also technological (i.e. how to solve a practical problem) or moral. In all these fields, abduction marks the creative process of either inventing new concepts and principles or activating already existing ones. The premises of the abductive inference are the problematic facts that need to be addressed, and the result is the suggested theoretical approach. In the moral domain, this theoretical approach consists in the moral principle according to which the moral problem might be solved

³To be sure, Kohlberg and Candee's account is not free from inconsistencies that are revealed and discussed in Minnameier (2013).

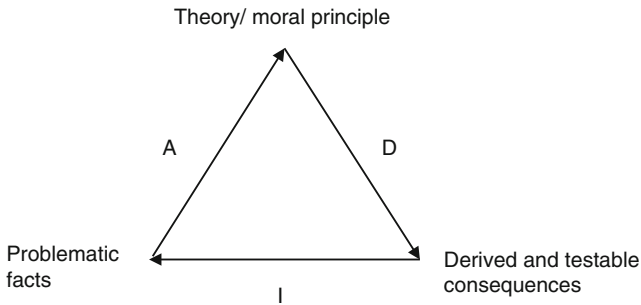


Fig. 3.3 The dynamical interaction of abduction, deduction, and induction

(e.g. “everybody has to care for themselves” [Stage 2A], “tit for tat” [Stage 2B], the ‘golden rule’ [Stage 2C], or “every employee has, as member of the company, to act in the company’s interest” [Stage 3A]).

Since any inference can be correct or incorrect, there has to be a criterion for the validity of abduction. Generally speaking, the abduced concept or theory has to be able to accommodate the (problematic) facts. Thus, explanatory theories have to provide a plausible explanation. An explanation can be true or false – this has to be established by way of deduction and induction, – but abduction as such merely has to determine whether a given theory solves the explanatory problem at least in principle. Similarly, a suitable moral principle must fit the moral problem at hand and allow us to decide which course of action is morally right and which is morally wrong. Again, whether we should ultimately accept the moral outcome of the application of our principle is a different question to be treated by the other inferences.

Deduction is the process that produces the outcome of the application of a moral principle to a situation. Consider the example of the shop assistant who has to decide whether or not to inform a customer about a slight defect of a certain good (this is the moral problem). They consider the ‘golden rule’ (by way of abduction), and now they work out what the principle requires them to do in this situation. The golden rule requires them to consider what they would want, if they were in the customer’s shoes, as an additional premise. From this rule and the situational and additional premises the resulting course of action can then be deduced straight away.

However, we are not forced to accept this outcome. Logical truths are not factual truths, and deductive consequences of moral principles merely tell us what we *would* have to do if we accepted the principle. After all, we first have to know these deductive consequences before we can establish whether they are practically appropriate. This is where *induction* comes in assist to decide whether one should do practically what has been derived theoretically. There may always be side effects or specific risks that may prevent the individual from following the deduced course of action. For instance, the shop assistant may realise that while the ‘golden rule’ is generally applicable, it is insensitive to the different roles of customer and salesperson.

Induction leads back to the problematic facts, because it determines – based on past experience or newly gathered experience e.g. from experiments – whether to accept or reject the theoretical approach for the problematic situation at hand. However, the inductive result is not restricted to this one situation only, but rather applies to all relevantly similar situations, past, present, or future. In this way, existing moral orientations may either be reinforced (if the commonly activated principle is also accepted in the present situation) or may be changed as a result of newly encountered conflicts or negative aspects.

Based on the types of situations differentiated and classified in this paper, we can assume that the more experienced we are and the more expertise we have acquired in those situations, the more naturally we will abduce to situation-specific moral principles (if we undergo explicit reasoning at all, especially within in routinized action-schemes). What is more, our situational selectivity is, on the inferential account, neither hardwired nor based on rigid categorisation or segmentation, but is always controlled, reinforced or weakened by inductive evaluation, which secures flexibility and adaptivity in the sense of controlling and developing our situational differentiations: in the way we perceive situations, in the principles we deem appropriate, and in the personal responsibilities to which we feel committed (as individuals or as members of an organisation). This has also been revealed in a study on students of management science (Minnameier and Schmidt 2013).

To sum up, abduction, deduction, and induction, cover the whole process of moral reasoning and allow us to integrate the processes of activating moral principles, of determining what action would follow from a certain principle, and the evaluation of this action in terms of a responsibility judgement. This yields a broader and more comprehensive notion of moral judgement. In this respect, the three inferences are not only meant to explain how moral-cognitive development proceeds, but also how stages are activated and used in actual moral practice and how moral judgement can be attuned to situational affordances and constraints.

3.3.3 The Moral Self and Moral Functioning

As already explained, scholars from the field of business ethics have proposed a model of interaction of individual factors and situational factors. Whereas the situational factors and how they influence moral judgement have been sufficiently treated in the previous sections, the role of individual factors still has to be discussed. What are these individual factors? Of course, the ability of moral judgement is a key element in this respect. Church et al. (2005) even take it as the only truly important aspect. On top of it, however, Treviño includes ego strength, field dependence, and locus of control (1986, 602), and in later publications also moral awareness, moral disengagement and other cognitive biases (Treviño et al. 2006). Such biases currently receive much attention (see, e.g., Ariely 2012; Bazerman and Tenrunsel 2011)

From a theoretical point of view it is still an open question, how all these factors hang together conceptually and in relation to the above-mentioned models of moral

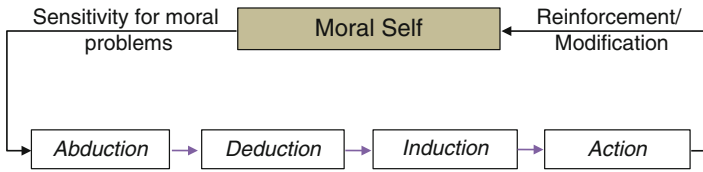


Fig. 3.4 The moral self and moral functioning

functioning. They are often discussed in connection with the so-called ‘moral self’ (see Bandura 1999; Blasi 1995, 2004; Shao et al. 2008). With respect to the inferential analysis described in the previous section, however, it becomes obvious that, at least to some extent, these moral biases refer to processes of moral reasoning, i.e. to ways of taking moral decisions and justifying one’s decisions and actions.

Originally, the moral self was associated primarily with judgements of responsibility (and moral motivation), and a lack of responsibility or moral motivation was explained in terms of a weak or insufficiently developed moral self. Meanwhile, the concept of the moral self has been extended and includes moral identity, moral responsibility, and a tendency to strive for self-consistence (see Shao et al. 2008, 514, who summarise Augusto Blasi’s contributions to the theory of the moral self and distinguish three different “components”). Without being able to explicate this in detail in the present context, it seems that Blasi’s “moral identity” is associated with Rest et al.’s (1999) first component (‘moral sensitivity’) and “strife for self-consistency” with the fourth (‘moral character’). If and insofar as this is true, one may be tempted to suspect even a fourth component of the moral self in the sense of *the degree to which one wants to be just and know what is right*. And this component could be associated with ‘moral judgement’ in the narrow sense. In other words, the moral self, which is meant to explain specific aspects of moral functioning, boils down to a reiteration of those very aspects (the four components).

However, the moral self is said to be of a ubiquitous relevance to almost all aspects of moral functioning (see Blasi 1995; Frimer and Walker 2008). Now, instead of assuming four separate “components” of the moral self, these “components” might just as well be conceived of as mere aspects of one integrated moral self, i.e. how the (single) moral self affects the different processes of moral functioning, especially the abductive, deductive, and inductive processes of moral reasoning (as illustrated in Fig. 3.4). This view leads us to an understanding in which the moral self might be constituted of underlying personality traits that are operative within and across the processes of moral functioning.

The question of how to conceptualise the moral self, especially at the intersection of moral cognition and other aspects of moral functioning, has been considered as a still open, yet most important one (see e.g. Hardy and Carlo 2005; Frimer and Walker 2008). The above account at least provides a possible and plausible solution.

Let us now consider, in the context of the four phases according to Kohlberg and Candee (1984, 71), how the moral self might influence the four processes of moral functioning ('interpretation and selection of principles', 'decision making', 'follow-through (moral judgment)', 'follow-through (nonmoral skills)'), especially how it interacts with situation-specific inferential moral reasoning.

1. "Interpretation and selection of principles": First, the individual must become aware of a moral problem in the ordinary flow of events. If moral centrality (see e.g. Blasi 1995, 2004; Frimer and Walker 2009; Frimer et al. 2011) is high, it is assumed that individuals have a greater propensity to attend to moral aspects. If they identify a moral situation and attend to it, however, the cognitive process of abduction starts, in which one first gathers the relevant situational features and comes to a preliminary solution in the form a principle that might fit.
2. "Decision making": Deduction in the context of moral reasoning yields a course of action as the necessary consequence of applying a principle to situational premises. This is a process that might be labelled "cold cognition". However, it is heated up by the previous motivation to reason about the situation. And when it comes to moral values that are central and constitute the moral self, these values may also include the principle itself, so that its activation based on the situation may be emotionally propped up by its very meaning for the self.
3. "Follow-through (moral judgment)": Above, I have stressed the cognitive aspect of this part of moral judgement and identified it with inductive reasoning in the Peircean sense. In this process one judges the acceptability for the self (or another agent) to act in a particular way. In determining this one not only has to consider objective side conditions and outcomes, but also the characteristics of the agent him- or herself. If helping others is a central motive and a feature of the self, it will be right for such persons to help even at significant personal costs.
4. "Follow-through (nonmoral skills)": A strong moral self will increase the individual's compliance with his or her moral decisions, because the remorse or bad conscience must be all the greater.

A strong moral self in this sense should make people attend more than others to moral aspects in their daily practice, it could make them reflect moral problems further (i.e. at higher stages) than others, feel responsible to a greater extent than others and stick more to their principles rather than betraying them.

In summary, these qualities are considered to be positive. However, in the business context one might suspect that a weaker moral self might be better for business. In a way this may even be true. Nonetheless, as will be argued in the following concluding section, higher moral stages and a strong moral self may also be relevant in business practice in all occupational contexts, and therefore situational sensitivity and adaptivity might be the real thing to go for in vocational education and training in order to bring about appropriate professional attitudes and actions.

3.4 Implications for Professional Practice and Vocational Education and Training

Professionals of all kinds may be confronted with a wide range of moral problems that they have to handle. To judge those situations properly, they need to be able to distinguish different types of situations and tune their actions accordingly, rather than acting from an abstract god-like perspective, from which situational constraints might be irrelevant (especially consequences for the self). However, this judgement is not enough. They have to at least consider two further aspects.

The first is that they do not act as individuals like they do in their private lives, but as representatives of a company or organisation. And as such, their responsibility goes beyond mere loyalty toward the company. In fact, companies – like other organisations – are integral parts of our overall societal organisation. In particular, a market economy is built on the principle of competition. In this competitive framework businesses are not only meant to adapt to people's needs and satisfy those needs, but also to do this efficiently in order to save resources and direct them where they are needed most (see e.g. Hayek 1976; Vanberg 2001). This is the main and the moral function of competitive markets. In this view, cost-saving controllers and top-selling merchants are, at least in principle, not just acting in their own or their company's interest, but also fulfil an important socio-economic function. Every worker, every employee, every manager and every entrepreneur has to be aware of this role within the society at large that he or she plays when acting on behalf of a company or organisation (see also Clark and Lee 2011).

However, companies or the responsible managers may also engage in dysfunctional activities such as evading taxes, ignoring safety regulations or duping their customers. Responsible professionals, therefore, do not simply have to fulfil their superiors' demands and boost profits, but they also have to live up to the standards of their professions (irrespective of their particular job in their particular company). Moral hazards, which derive from information asymmetries, have been discussed above. They exist especially where professionals have expert knowledge and where their clients have to rely on their expertise, and this is not restricted to what we call 'professions' in the narrow sense (including engineers, architects, medical and judicial professions, and possibly teachers and trainers), but to everybody who works for somebody else either by producing something or by giving counsel. Consider e.g. the work of craftsmen or of financial advisers. Advantageous and dishonest behaviour produces mistrust, and if this happens at a sufficiently large scale, it constitutes a problem not only for individual companies or self-employed persons (whose reputation is spoiled), but also for the professions at large and as such.

As a consequence, professionals have to adopt professional moral standards, yet be able to analyse and distinguish situations and develop differentiated action strategies. On the one hand, they have to staunchly adhere to their professional standards, especially because there will always be loopholes that they should not use. In particular they should refrain from misusing their informational superiority for illicit purposes. Furthermore, economists know the principles of incomplete contracts,

i.e. that there will always be ways to cheat on one's counterpart, if one likes to do so. Apart from the fact that one's partners might 'strike back' in some way, basic trust and trustworthiness are needed in the sense that everybody plays by the rules (be they explicit or tacit).

An additional aspect of professional ethics relates to behavioural standards in day to day business. Professionals have to remain friendly and considerate even when their counterparts are not. And, conversely, they have to stick to their ordinary rules and practices, even when they deal with friends or relatives as clients. In this sense, they have to be "situation-insensitive" in their attitudes and homogeneous in their actions.

In sum, all professionals, i.e. even those in lower ranking occupations, have to adopt fairly high moral stages to be competent and reliable agents in all relevant situations. Note that what has just been called "playing by the rules" refers to Stages 3B and 3C in terms of the neo-Kohlbergian taxonomy mentioned above, and would also have to be classified at least as "Stage 3" in Kohlberg's terms. Yet at the same time, professionals have to be sensitive to constraints, especially their counterparts play different moral games at lower moral stages (i.e. when they change the rules of the game). If one is exploited or underpaid by one's principal, one is certainly justified seek one's benefit if it is not possible just to leave the firm and work somewhere else. If competitors successfully and to a large extent manage to circumvent regulations, a company cannot keep on as if nothing were happening, because this leaves the unethical companies with a cost benefit and would ultimately lead to the survival of the black sheep and the extinction of the white ones, which is clearly dysfunctional and unacceptable. Therefore, professionals not only have to play by the (agreed or common) rules, but also know and adapt to the rules of the games actually played.

As far as loopholes, illegal practices or external effects are present, professionals and companies, as agents in a market economy, have some kind of split responsibility. On the one hand, they have to take situational circumstances seriously in the way just explained. However, they also have an ethical role to play as members of organisations that have specific functions in society. Adapting to situational constraints is one thing, working towards changing inappropriate incentive structures and dysfunctionalities is another (Beck 2008; Beck et al. 1999, 2002; Minnameier 2004b, 2008, 2011). In other words: While one has to play by the rules of all kinds of games actually played in order to survive in competitive markets, one can – and possibly should – engage in the improvement and transformation of those rules. This applies especially to powerful multinational companies, because they sometimes have even more regulatory power than governments (Homann 2002), but also to professions with high and specialised expertise, because they know better than others, what moral problems, perils, and pitfalls we have to deal with in the relevant contexts.

All in all it is of vital importance for professionals to realise that they actually act in different roles, even if we only focus their role as professionals (!), and in multitude of systematically different situations. However, one major difficulty, and therefore also one major task, with respect to situational adaptation is to distinguish between appropriate situational adjustment on the one hand, and moral biases (as described by Bazerman and Tenbrunsel 2011) on the other hand.

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Chapter 4

Professional Work and Knowledge

Lina Markauskaite and Peter Goodyear

Abstract This chapter provides an overview of some influential perspectives on the relationships between professional work and professional knowledge. We build upon a number of recent developments in theories of knowledge, skill, expertise, capability and action to help reframe understandings of professional knowledge as culturally and socially situated and materially grounded. We draw on ideas from cognitive ecology and developmental psychology to argue that effective professional action often depends upon tools and resources that come to hand in the workplace – it is the accomplishment of an “extended mind”. We also use recent research on the active nature of perception to argue that professional expertise is often highly dependent on “conceptual perception” and “sensory intelligence”. We suggest that employers and providers of professional education, and quite possibly students themselves, expect too much from the kinds of knowledge that can most readily be acquired in formal education settings: explicit, conceptual and principles-based knowledge. When employers comment negatively on the sharp contrast between the practical capabilities of new graduates and the capabilities of their more experienced workers, part of what they are noticing is – we argue – emergent from, and constitutively entangled with, the workplace setting. A richer understanding of how effective and innovative professional practitioners do what they do is needed, to make progress in the design and evaluation of professional education programs.

Keywords Professional knowledge and knowing • Professional work • Professional education • Professional vision • Epistemic fluency • Extended mind • Perception-action • Grounded cognition • Epistemic environments

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4.1 Introduction

4.1.1 *Aims of the Chapter: Harmonising Multiple Views on Professional Knowledge to Illuminate Persistent Problems in Professional Education*

This chapter provides an overview of a number of influential perspectives on the relationships between professional work and professional knowledge. Its ideas are relevant to researchers specialising in this field and also to people with a serious stake in the organisation of professional education, including employers and those in higher education who provide programs preparing students to work in the professions.

We provide a brief review of some perspectives on professional knowledge that have become quite established in the last 40 years or so. However, our main contribution is to use a number of recent developments in theories of knowledge, skill, expertise, capability and action to help reframe understandings of professional knowledge as culturally and socially situated and materially grounded. We draw on ideas from cognitive ecology and developmental psychology to argue that effective professional action often depends upon tools and resources that come to hand in the workplace – it is the accomplishment of an “extended mind”. We also use recent research on the active nature of perception to argue that professional expertise is often highly dependent on “conceptual perception” and “sensory intelligence”. We are coming to the view that employers and providers of professional education, and quite possibly students themselves, expect too much, and too many different things, from the kinds of knowledge that can most readily be acquired in formal education settings: the kinds of explicit, conceptual and principles-based knowledge that can be shared in lectures and through textbooks. When employers comment negatively on the sharp contrast between the practical capabilities of new graduates and the capabilities of their more experienced workers, *part* of what they are noticing is (we argue) emergent from, and constitutively entangled with, the workplace setting. Further, no one will dispute the fact that it takes some time to *learn* local working practices, even for an experienced professional who has moved into a new organisation. But our sense is that much of what enables fluent professional practice *in situ* has been hazy, if not invisible, and underestimated. The chapter aims to redress the balance, and thereby raises some questions about what could be a more reasonable set of expectations from initial professional education programs, about transitions to work (and between workplaces), and about what all parties – universities, accrediting bodies and employing organisations – need to contribute to a more effective regime of professional preparation. It does this by highlighting one kind of knowledge that we see as particularly useful for making transitions – knowledge for creating epistemic environments to support one’s learning and cognition.

4.1.2 *Structure of the Chapter*

The rest of this chapter falls into eight sections. We start with a brief review of the central place given to specialist knowledge in accounts of professional work. Then we introduce some basic conceptual building blocks and key terminology that prove necessary for an understanding of the main arguments that are developed in the rest of the chapter. We make some distinctions, and draw some relations, between public, organisational and personal knowledge; learning to understand and learning to do; knowledge as a possession and knowing in action.

In the next section of the chapter we introduce the core idea of *epistemic fluency in professional practice* (Markauskaite and Goodyear [forthcoming](#)). We do this by describing four *epistemic projects* – a term that we use to capture what we hope will be recognisable genres of working with knowledge in professional activity. We sketch each of these epistemic projects in turn, making links to some of the key writings on professional knowledge as we do so. The next two sections of the chapter introduce a fifth epistemic project and revisit some of the earlier ideas about the nature of knowledge, bringing in some recent research on embodiment and grounded cognition. This part of the chapter introduces some contemporary ideas about the interdependence of knowledge, perception and action, sketching aspects of professional work and knowledge in a way that captures professional action as the accomplishment of an extended mind. The chapter concludes with a summary of some implications for the organisation of professional education.

4.2 Professional Work and Workplaces

It is not easy to pin down the meanings of the terms ‘profession’, ‘professional’ and ‘professional knowledge’. The core term – profession – has denoted different occupations at different times and in different places. Its interpretation is strongly coloured by its association with medicine and law – fields often seen, in the literature and in higher education, as the archetypal professions (Glazer 1974). In recent years, in Western countries, other occupations/fields have been added to the list: engineer, architect, scientist, for example. Others have pushed to join the club. Some have succeeded. Some have been consoled with titles like ‘para-profession’ or ‘minor profession’. Moreover, the very idea of profession has to be seen as both historically and spatially located. If one traces the history of occupational fields in China, India or other non-Western countries, different ideas about professions and professional hierarchy emerge.

In twentieth century western sociological accounts of the professions, definitions tended to focus on two aspects of this area of work: knowledge, and the relationship between the professional and the client. For example, Carr-Saunders and Wilson (1933) speak of “prolonged and specialised intellectual training which

allows a particular service to be rendered” (p. 478). Talcott Parson’s classic analysis defines professional work as entailing provision of a service, based upon a body of expert, scientific knowledge (e.g. Parsons 1968). While the nature of the relationship between professional and client may have changed substantially, the insistence on *expertise* as a distinguishing mark of the professional has not (Jensen et al. 2012).

Professional knowledge, more narrowly defined, has long been used to locate professions in a hierarchy.

One of the major differences between the major and minor professions is that practitioners of the minor professions do not possess knowledge at the same level of technical complexity and of the same importance to an individual’s life as that possessed by the classic major professions (Glazer 1974, p. 348).

we find that the knowledge and skills requisite for an occupation is the best single predictor of the prestige assigned to it. Value to society ... has no predictive value of prestige over and above the other dimensions considered (Adler and Kraus 1985, p. 36).

Early forms of professional work (e.g. in medicine or law) normally involved provision of a service by an individual rather than an organisation, though some professionals came together in arrangements which allowed some sharing of costs and resources. These days, services are more commonly offered through organisations than by independent professionals. While specialist knowledge continues to be seen as crucial to the provision of professional services, one can argue that the forms of knowledge and ways of knowing now needed by professionals have become more complex, diffuse and specialised. For good or ill, a doctor working in today’s public health service needs a broader range of knowledge (e.g. how to get things done, how to utilise the expertise of others, how to make a career in the health system) than was the case with independent practitioners in the nineteenth century.

Just as the tendency for professional work to be enacted in more complex organisational contexts has required the acquisition of knowledge specific to the employing organisation, so changes in the material setting of professional work have extended the range of knowledge required. (Professional work has, therefore, to be understood as both socially/organisationally situated and physically/materially situated.) The material changes in professional work are both vivid and subtle. For example, many professionals now have a much richer array of technologies to use in the workplace. But in some aspects of their work, communications technologies redistribute labour, moving parts of the job (or of the “workflow” or value chain) to distant sites.

Professions share some characteristics, but there are important differences between them. Also, the range of activities *within* any one person’s professional practice can be very varied – with concomitant variations in the relations between what they are doing (moment-by-moment) and what they know. It is important to bring this variability to mind, when thinking of the nature of professional work and knowledge, lest an undifferentiated conception, or a too dominant image, oversimplify both the work and its relationship to what is known.

4.3 What Is Knowledge?

It is impossible to classify ideas about professional knowledge in a simple, uniform way. The fundamental message that comes from research on professional knowledge is quite consistent. Professional workers, especially experts, draw on a *variety* of knowledge types and they learn this knowledge and draw upon it in their professional practice in a *variety* of ways (Argyris 1993; Bereiter 2002; Collins and Evans 2007; Collins 2010; Davenport 2005; Eraut 1985, 1994, 2010; Ericsson 2009; Farrell 2006; Harper 1987; Hoffmann and Roth 2005; Schön 1983). Moreover, while there is some agreement in the literature about some aspects of professional knowledge – including a reasonable consensus on the importance of specialist, personal, applicable knowledge – there are some deep differences about what knowledge is, and about how it connects to perception and action.

4.3.1 Knowledge, Broadly Understood

We use the term “knowledge” in the broadest sense, to include justified propositions, hunches, beliefs and other constructs of human thought; tacit as well as explicit; conceptual and procedural; abstract and concrete; personal and public (Hoy and Murphy 2001; Murphy and Mason 2006; Southerland et al. 2001; Bereiter 2002). Human thought is composed of different kinds of epistemic entities, such as knowledge, beliefs, values and moral judgements. These epistemic entities have different features, come together in different relationships, and have different kinds of implications in discussions of what is true and how things might be known. For example, “knowledge” often refers to factual, externally verified and logically organised ideas; whereas “belief” usually refers to propositions and ideas that individuals feel to be true irrespective of external validation or justification (Hoy and Murphy 2001). However, as Southerland et al. state:

Distinctions between knowledge and belief, complex and confusing at the theoretical level, seem to become hopelessly blurred at the empirical level (Southerland et al. 2001, p. 348).

Towards the end of the chapter, we revisit some of the fundamental ideas about knowledge, action and perception, with the aim of sharpening their application to understanding the area of professional expertise and professional education.

4.4 Public, Personal and Organisational Knowledge

In this next section, we distinguish between public knowledge and personal knowledge and then introduce the idea of organisational knowledge as a kind of knowledge that emerges at the intersection between, and as an entanglement of, the public and the personal. All three – and their interactions – are required in a comprehensive picture of the relations between professional work and knowledge.

4.4.1 *Public Knowledge*

Public knowledge is knowledge that is made available by culture – what Bereiter (2002) calls “knowledge outside the mind” (p. 56). It includes both codified and non-codified knowledge.

Codified public knowledge includes all the knowledge that is represented in some *inscribed form*; thus, it can be shared and used beyond the immediate communities, sites and people who produced it. For Eraut (2010, p. 38) codified public knowledge is most typically made available through books and journals, particularly those involving a review process which bestows the status of “acceptance” – allowing it to be incorporated into a profession’s knowledge base. Codified public knowledge also includes other kinds of knowledge embedded in material inscriptions that are available to members of a professional community, including formal educational resources, qualification standards, professional databases and informal resource collections. Broadly, this knowledge has the qualities of what Bereiter calls “conceptual artefacts” (2002, p. 64).

Non-codified public knowledge includes knowledge that is *embedded* in cultural practices rather than inscribed in some tangible form. Professionals learn such knowledge through participation in working practices. Some non-codified public knowledge is embedded in the discourses and other practices of professional communities. Some of it is situated and emerges from engagement in local activities – involving relationships among the people, tools, artefacts, historical and cultural material and the social and physical environment in which practice takes place. In both cases, this knowledge is not available (in its original non-codified, non-inscribed form) beyond those communities and practices and so it can only be acquired through direct personal engagement and socialisation.

4.4.2 *Personal Knowledge*

Personal knowledge or “knowledgeability” (Bereiter 2002, p. 193) can be defined as what an individual knows and is able to accomplish. It refers to personal attributes, capacities and other qualities, and, as Eraut suggests, it can be described as “the individual-centered counterpart to cultural knowledge” (Eraut 2010, p. 37). In specific professional contexts, it can be described more narrowly – “what individual persons bring to the situation that enables them to think, interact and perform” (Eraut 2010, p. 37); or what Yinger and Hendricks-Lee, drawing on Harper (1987), call “working knowledge”: the kind of knowledge that is “particularly useful to get things accomplished in practical situations” (Yinger and Hendricks-Lee 1993, p. 100). Other terms have been used for similar kinds of knowledge and knowing, such as “knowing in action” (Schön 1983), “actionable knowledge” (Argyris 1993), “action-oriented understanding”, “personal practical knowledge” (Clandinin 1985) and “*metis*” (Baumard 1999).

Personal knowledge involves different kinds of mental constructs. For example, some such knowledge may be concrete – facts, stories, or episodic experiences; other knowledge is abstract – involving concepts, schemata, procedures and principles.

Some of this knowledge may be *explicit* – available to consciousness – and some is *tacit* or *implicit*. (One may be able to do something, without knowing that one has, or being able to say how.) Explicit and tacit could be seen as individual (embodied and embrained) counterparts of codified and non-codified knowledge: the former is available to consciousness, reflection or discourse; the latter is enacted in doing. When it comes to professional knowledgeability, tacit knowledge often attracts most attention as something essential, but hard to teach and learn.

4.4.3 Organisational Knowledge

There are some other kinds of knowledge that occupy a large space between public and private knowledge: such as community knowledge, organisational knowledge and group knowledge. Given this chapter's concern with professional work and the fact that much professional activity occurs within organisational settings, we refer to this category of knowledge as "organisational knowledge." Organisational knowledge can be seen as an assemblage of personal knowledge and a subset of cultural knowledge that is made available to everyone within an organisation or group. It will normally include both tacit and explicit elements. It may take the form of shared symbolic artefacts, such as rules, codes, organisational routines and codified propositions embedded in organisational artefacts. As Argyris and Schön put it:

When organizations are large and complex, their members cannot rely entirely on face-to-face contact to help them compare and adjust their private images of organizational theory-in-use. Even in face-to-face contact, private images of the organization often diverge. Individuals need external references to guide their private adjustments. Such reference functions are fulfilled by organizational maps, memories, and programs... Artefacts such as these describe existing patterns of activity and serve as guides to future action (Argyris and Schön 1996, p. 16).

In short, organisational knowledge can be seen as an internal property of an organisation. Organisational knowledge is not the mere aggregation of the knowledge of the individuals who work for the organisation. Tsoukas and Vladimirov (2001) note,

organizational knowledge is the set of *collective* understandings embedded in a firm, which enable it to put its resources to particular uses (Tsoukas and Vladimirov 2001, p. 981, emphasis added).

However, Tsoukas and Vladimirov (2001) also observe that the open-endedness of the world "gives knowledge its not-as-yet-formed character" (p. 989). They argue that it is individuals who put organisational knowledge into action and there is always an improvisational element in how individuals make sense of organisational propositions and how they enact this organisational knowledge in specific contexts and situations (see also Cook and Brown 1999; Orlikowski 2002, 2007; Weick 1995, 2001; Weick et al. 2005).

From this point of view, organisational knowledge can be seen as involving the collective capability of members to make sense of situations and carry out their work. Thus, use of organisational knowledge *depends on* individual understandings, but it cannot be seen as a static property of one individual's mind (or of an aggregate of minds). Rather, in its totality, it is a dynamic property of individuals and groups that emerges in performance, across contexts and situations over time.

4.5 Knowledge and Professional Action: Foundational Ideas

Discussions about professional learning are sometimes bedevilled by a set of apparently simple tensions between “theory” and “practice”, “academia” and the “workplace”, “knowing that” and “knowing how”, “knowledge” and “knowing”, “tacit” and “explicit”, “stability” and “flexibility”, “routine” and “change”. In this section we attempt to pin down some key ideas about knowledge that are needed to understand its relationships with professional action. We cover (a) doing and understanding; (b) knowledge and knowing (c) commonalities and differences in professional ways of knowing.

4.5.1 *Learning to Do and Learning to Understand*

If successful task performance were impossible without correct understanding, human culture could not have gotten started. ...In fact, all the technologies that brought the human race out of subsistence – metal working, leather preparation, the manufacture of cloth and glass, navigation, waterwheels and windmills, sailing boats, bread baking, brick making – had to be invented and developed in the absence of deep understanding, because such understanding has only become available since the scientific revolution, three centuries or so ago (Ohlsson 1995, p. 49).

Ohlsson (1995) provides a useful set of distinctions and relations between practical knowledge and declarative knowledge. *Practical knowledge* is the knowledge needed for accomplishing something in an efficient way. Such knowledge includes sensorimotor skills (e.g. driving a car) and cognitive skills (e.g. calculating, playing chess). The main outcome of mastering such knowledge is *competence* and, as Ohlsson argues, acquiring competence starts from general methods (e.g. analogical reasoning) and becomes an increasingly specific and automatic (“proceduralised”) skill. Such “know how” is generally acquired through mimesis (imitation) and by extensive practice. The medium for it is action.

In contrast, *declarative knowledge* includes concrete facts and higher order abstract knowledge of concepts, ideas, theories, schemas, principles and propositions. Ohlsson argues that learning “higher-order” knowledge proceeds in the opposite direction from that taken in the development of practical knowledge. It starts from knowledge which is taken for granted and increasingly becomes more

conscious, explicit, elaborate and abstract. The main outcome of mastering such knowledge is *understanding* or “knowing that”. Such knowledge is acquired mainly through reflection, and the medium for it is discourse. As Ohlsson notes, one can act successfully without understanding what one is doing, and understanding does not guarantee successful action.

4.5.2 *Knowledge and Knowing*

Ohlsson’s (1995) distinction between competence and understanding is relatively clear cut. However, once one looks at action and understanding in professional work in organisational settings, the relationships become more complex.

Cook and Brown (1999) make a useful distinction between the “epistemology of possession” and “epistemology of practice.” Knowledge is sometimes treated as something people or organisations *possess*. While such knowledge is important, it does not account for what one *can do*. For example, when a mechanic fixes a car, her knowledge involves not only what she possesses and applies, but also what she is doing. Cook and Brown extend the view of *knowledge as possessed* with the view of *knowing as a part of action*.

understanding of the epistemological dimension of individual and group action requires us to speak about both knowledge *used in* action and knowing as *part of* action (Cook and Brown 1999, p. 53, original emphasis).

The former focuses on *knowledge* employed in understanding and action; the latter focuses on *ways of knowing* employed for understanding in action. Cook and Brown point out that tacit and explicit, individual and collective types of knowledge are not mutually substitutable and neither do they sit in a hierarchical relationship: rather each of them makes a distinct contribution to knowing in action. Further, actionable professional knowledge involves what is already known, but it is also involves practice, and some epistemic work is inevitably done in action and by action. That is, knowledgeable action demands fusions between understanding and doing, and knowledge as possessed and knowing in practice.

4.5.3 *Generic Thinking Skill and Professional Episteme*

Do professions differ in what they know, or also in their ways of knowing and thinking? Classic studies of professional expertise have tended to the latter view. The military, science, law, medicine, design and other professions have been described as involving distinct forms of thinking and reasoning with distinct “shapes” to their professional knowledge (Ericsson et al. 2006; Holyoak and Morrison 2005). Other, more “mundane” or “minor” professions, are now also described as having special ways of working with knowledge: “thinking like a teacher” or “thinking like an

accountant” for example (Sternberg and Horvath 1999). However, if we look closely at the literature that tries to describe those distinct forms, we notice more similarities than differences. Consider law and medicine. Studies of legal reasoning focus on two main methods: deductive or rule-based reasoning and analogical or case-based reasoning (Ellsworth 2005). Research on medical diagnosis distinguishes between forward (data-driven) and backward (hypothesis-driven) reasoning strategies. However, it also commonly makes a distinction between two ways of thinking that have similar forms in legal reasoning: causal-analytical reasoning, which employs basic medical (or legal) knowledge and rule-based logic, and exemplar-based reasoning, which draws on the recognition of similarities between new and previously-encountered cases (Norman et al. 2006; Patel et al. 2005).

Cognitive strategies do not seem to be unique to specific professions, rather, distinctions arise in the ways of thinking, sensing and doing that emerge from the assemblages of cognitive strategies, declarative knowledge, tools, aims and contexts in which professional actions and knowing takes place – that is “professional epistemes”. (A range of synonyms is used for this idea: “constitutive entanglements” (Orlikowski 2007), “knowledge assemblages” (Turnbull 2000), “meshes” (Ingold 2011)).

Ellsworth (2005) provides a nice illustration of the sources of this complexity by comparing legal decision-making with that of scientists:

Science demands no final decision; it is an ongoing process. If the evidence is murky, scientists can wait, can reserve judgement until they can conduct further research. And they can figure out what further research needs to be done to answer the question, and do it. Judges can neither reserve judgement nor go beyond the data presented in court, however ambiguous those data might be. They cannot carry out further research, nor wait until others have done so; they must decide. And the judge’s decision, whether the evidence is conclusive or completely inadequate, has the same precedential force. It is final. The scientist’s conclusions are never final, always tentative. The judge must also decide for the one side or the other; the scientist’s decision that the true lies somewhere between the extreme points is typically not available to the judge (Ellsworth 2005, p. 696).

So as Ellsworth points out, the process and form of legal and scientific reasoning are not so different – the two professions share many analytic strategies. Nevertheless, “the context, the raw materials to which the processes are applied, and the nature of the rules” are very distinct to each profession (p. 686).

4.6 Epistemic Fluency and Professional Knowledge: Tracing Four Epistemic Projects

Our research on the kinds of assessment tasks that students are given in the course of preparation for their professions reveals four distinguishable kinds of task, each of which can be traced back to an underlying “epistemic project” (Markauskaite and Goodyear [forthcoming](#)).

Drawing on Pickering (1995) and Mulcahy (2011) we contrast two views of professional learning: the *representational* and the *performative*. Each of these

involves distinct kinds of “epistemic tricks” that students need to master. We call them “self-representation” and “self-performance”. The former links the *doing* implied in professional action and skill with *knowing* (or indeed professional identity/being *as knowing*). The latter links *doing* with *being* (or indeed professional knowing *as being*). We also suggest that students find themselves challenged to go beyond the individual, beyond self-representation and self-performance in the here and now. They are challenged to engage in professional tasks on the boundaries of their professions. One set of boundaries is *temporal* – extending doing and knowing from the past and present into the future. The other set of boundaries is territorial or *spatial* – extending doing and being from “assembling the professional self” (Mulcahy 2011) to crafting new professional assemblages and dwelling in inter-professional, trans-epistemic spaces. We argue that professional learning for such a dynamic professional world involves mastering the fusion of all four epistemic tricks – self-representation and self-performance within and across the spatial, temporal and material boundaries of one’s profession. We call the resulting capacity “epistemic fluency” (Morrison and Collins 1996; Goodyear and Ellis 2007; Goodyear and Zenios 2007; Goodyear and Markauskaite 2009).

This section provides a brief summary of the four main epistemic projects. Each is presented in terms of the development of ideas, rather than as a static position. After the fourth description, we introduce a relatively novel, fifth, more grounded, notion of professional knowledge.

4.6.1 The Reflective-Rational Project: From Rational Knowledge to Reflective Practice to Rational Reflection

In real-world practice, problems do not present themselves to practitioners as givens. They must be constructed from the materials of problematic situations that are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He must make sense of an uncertain situation that initially makes no sense (Schön 2002, p. 47).

This epistemic project becomes familiar when traced back to the intersection of two lines of thinking about (i) the connections between theory and practice and (ii) reflection (Schön 1983; Eraut 1994). Schön (1983) critiqued the dominant positivist idea of an epistemic canon of professional knowledge and made a distinction between technical rationality and reflective thinking (reflection in action and reflection on action). From the technical rationality perspective, practical knowledge is a form of applied science. Thus professionals should learn an extensive, coherent network of codified declarative knowledge, provided to them by basic science, and a number of general problem-solving heuristics. Then they

should develop the skills of applying these principles in rigorous, proceduralised ways to the problems they encounter. Schön opposed this view, pointing to uncertainty, uniqueness, value conflicts and other epistemic complexities encountered in professional practice. He argued that practical knowledge involves a capacity to *frame* encountered situations as problems. The epistemology of practice involves doing and thinking “on one’s feet”. Relevance, not just rigour, should be the basis for professional knowledge.

Schön was primarily interested in designers’ work and “designerly” ways of knowing-in-action that could be seen as “thin” and “slow” on the physical plane of action, but “thick” on the epistemic plane of mental work. Such thinking and action are not characteristic features of all professions. Eraut (1994) and some others (e.g. Usher et al. 1997) have wondered whether and how reflection in action may happen in other areas of professional practice, arguing that Schön essentially overlooks some psychological realities of reflective thinking, and worrying especially about the possibilities of reflection in action when time is critical. Eraut (1994) noted that many practical decisions have to be made in a short time and the scope for reflective thought is extremely limited in such situations. In these conditions, as Eraut argued,

reflection is best seen as a metacognitive process in which the practitioner is alerted to a problem, rapidly reads the situation, decides what to do and proceeds in a state of continuing alertness (Eraut 1994, p. 145).

Schön also argued that professionals reflect not only “in action”, but also “on action”, suggesting that there is another layer of professional knowledge and knowing, such as general principles, which is different from the knowledge involved in the rapid decisions of concrete problem-solving and which requires a different kind of reflection. In both cases, Schön opposed the notion of “the systematic knowledge base of a profession” – specialised, firmly bounded, scientific and standardised (Schön 2002, p. 41).

Eraut (1994) also questions Schön’s assertions about the limited use of propositional knowledge in practical situations.

the use of such theoretical knowledge may not always be in the application mode stressed by the technical rationality model, but in the interpretative mode where it is more difficult to detect. Moreover, just because busy professionals do not use a particular idea, does not imply that they should not: that remains to be argued (Eraut 1994, pp. 103–104).

Eraut (1994) also insists that there is no clear cut distinction between theory and practice. He agrees that the knowledge and knowing that underpin professional action should be of central importance in professional learning. He also agrees that the use of theoretical (propositional) knowledge in practical decisions requires considerable time and significant intellectual effort. In contrast, he argues that propositional knowledge must undergo significant transformation before it enters practice. Thus, the process of interpreting and personalising theoretical propositions needs considerable support in professional education.

4.6.2 *The Reflective-Embodied Project: From Knowing to Being*

...we do not primarily access things conceptually or intellectually, but, instead, through being constantly immersed in activities, projects and practices with things and others. We organise entities and creatures within these projects: breed livestock and prepare food for our families, for example. We also alter or construct things, such as fell trees and build houses, or re-orient streams and rivers. To be this way requires that we are open to the possibilities of things – the qualities of timber or fresh produce, for example, and what those qualities enable. Things, in turn, need to be receptive to our manipulations (Dall’Alba and Barnacle 2007, p. 681).

A more radical turn, not only away from technical rationality, but also away from the “intellect” (cognitive capacities) as a *basis* for professional action can be observed in other recent writing on the topic. The turn is towards the ontological project of “being” (Barnett 2004; Dall’Alba 2009; Dall’Alba and Barnacle 2007) and “becoming” (Scanlon 2011).

These writings have different roots, ranging broadly from Heidegger’s existentialist ideas about “receptive spontaneity,” (e.g. Dall’Alba 2009) to accounts that are more grounded in the physical world, in socio-materialist practices of “assembling the professional self” (Mulcahy 2011). This move is based on the assumption that the knowledge and skills needed for future workplaces cannot be known in detail or with any great certainty. Thus, attention to “knowing the world” and the skills for doing so provides an unproductive focus for educating future professionals in higher education. Rather, “being-in-the-world,” pulling disparate elements of practice together into one “assemblage of self”, provides a more defensible centre for professional education.

Dall’Alba and Barnacle (2007) question whether there is a universal form of knowledge, disconnected from experience. They argue that: (a) the current emphasis on knowledge and skills in higher education, decontextualised from the practices to which they relate, is flawed; (b) there is no one absolute universal knowledge, rather there are knowledges that are situated, localised, and “socially constructed in relation to specific knowledge interests” (Dall’Alba and Barnacle 2007, p. 680). This view challenges the primary focus of higher education on intellect, knowledge and transfer, and suggests an alternative account of knowing that dislocates mind and reason from a privileged, detached, position:

Where a conventional account of knowing has treated it as restricted to an ideal realm of thoughts, ideas and concepts, we want to situate knowing within the materiality, and spatial and temporal specificity, of being-in-the-world. In other words, knowing is not reducible to thought or the discursive. Instead, knowing is always situated within a personal, social, historical and cultural setting, and thus transforms from the merely intellectual to something inhabited and enacted: a way of thinking, making and acting. Indeed, a way of being (Dall’Alba and Barnacle 2007, p. 682).

This line of thinking holds that professional education has become too concerned with epistemology, at the expense of ontology (understood as a concern

for the nature of being and of existence). Dall’Alba and Barnacle’s “ontological turn” is not so much from epistemology to ontology, but to more ontological forms of knowing:

from epistemology in itself to epistemology in the service of ontology... In other words, learning is not confined to the heads of individuals, but involves *integrating ways of knowing, acting and being* within a broad range of practices (Dall’Alba and Barnacle 2007, p. 683, emphasis added).

Others have extended this ontological twist to speak of lifelong learning; from “being” to “becoming” (e.g. Scanlon 2011).

It is important to note that this view of knowledge does not deny, in any strong sense, the existence of a professional knowledge base, skills and competences.

Aspiring professionals need to develop necessary knowledge, routines and procedures for entering into appropriate care relations with those whom they provide a service; ontology and epistemology are both implicated. For example, accountants need to develop knowledge and skills in accounting in order to provide ethical accounting services that respect the needs of their clients (Dall’Alba 2009, p. 141).

What is more at stake is the question of *what else* is needed to provide a sufficient basis for acting effectively as a professional practitioner.

The main pedagogical suggestion that underpins this onto-epistemic project is that curriculum should be organised around core practices, meaning-making, reflexivity and identity: “Allowing students to encounter and reflexively dwell in this dynamism and complexity” (Dall’Alba and Barnacle 2007, p. 688). There are several variants on this line of thinking about professional knowledge. Nevertheless, the core pedagogical proposition is underpinned by a shared leitmotif of action or of performance: getting, body, mind and hands (and heart) to act together in a coherent dynamic ensemble with the environment and the ongoing action of others.

4.6.3 The Relational Project: From Individualistic to Relational Expertise

All learning involves boundaries. Whether we speak of learning as the change from novice to expert in a particular domain or as the development from legitimate peripheral participation to being a full member of a particular community (Lave and Wenger 1991), the boundary of the domain or community is constitutive of what counts as expertise or as central participation. When we consider learning in terms of identity development, a key question is the distinction between what is part of me versus what is not (yet) part of me (Akkerman and Bakker 2011, p. 132).

The discontinuities and tensions discussed in relation to the first two accounts (above), have emerged *within* the epistemological boundaries of professional domains. Whether these consist of socio-cultural discontinuities between university and workplace settings, or between different kinds of knowledge that constitute the internal workings and knowledge base of the profession, or between theory

and practice, knowing, doing and being – these boundaries are *within the epistemic space of the profession*, thus internal to a broader notion of becoming an expert practitioner within one’s professional domain. Crossing these “internal boundaries” – between school and work, learning and doing, etc. – have dominated the literature on professional learning in higher and vocational education for decades (Billett 2010; Eraut 1994; Sternberg and Horvath 1999; Tuomi-Grohn and Engeström 2003).

However, as Akkerman and Bakker (2011) note,

various types of professional work ... are heterogeneous in that they involve multiple actors representing different professional cultures... Hence, working and learning are not only about becoming an expert in a particular bounded domain but also about *crossing boundaries* (Akkerman and Bakker 2011, p. 143; emphasis added).

The expanding scale of such boundary work has been demonstrated in numerous studies of inter-disciplinary, inter-professional, lay-professional and other kinds of joint work (e.g. Derry et al. 2005; Engeström 2008; Hutchins 1995; Star and Griesemer 1989). In some domains, such as architecture, design, media, healthcare, social work and other public services, this kind of boundary expertise is not restricted to a specific group of people (such as sales people or customer care staff), but is a core part of professional competence. New accounts of professional expertise that deal with this capacity to work on epistemic boundaries have been emerging in variety of professional and scientific domains (e.g. Collins and Evans 2007; Edwards 2010). Thus, the notion of professional learning has to be expanded to include the capacities needed to work on the epistemic boundaries of professional expertise.

Edwards (2010) has offered the idea of “relational agency” or “relational expertise” and defined it as,

an additional form of expertise which makes it possible to work with others to expand understandings of the work problem as an object of joint activity, and the ability to attune one’s responses to the enhanced interpretations of those being made by other professionals (Edwards 2010, p. 13).

She explains that this kind of expertise primarily arises from two dynamically interrelated sources: (a) recognising other professionals as resources – what is salient for them and what they bring when they interpret the joint object of activity; and (b) aligning one’s own responses and actions to the emergent interpretations and actions of others. Edwards argues that relational expertise involves a purposeful inter-professional activity as well as “weaving” clients’ private knowledge into professional decisions (2010, p. 15). While such decision-making does not necessarily involve established procedures or pre-existing ideas, it can be learnt. Edwards is, nevertheless, convinced that core professional expertise is essential and warns against “the dilution of personal specialist expertise” (Edwards 2010, p. 15).

Learning to work across the (spatial/territorial) boundaries of one’s home profession has a temporal complement – learning to push at the frontiers of knowledge and extend them, through innovations in practice. We now turn to this fourth area.

4.6.4 *The Knowledge Building Project: From Practice as Knowledge Transfer to Knowing as Epistemic Practice*

new knowledge is created also by professionals in practice, though this is often of a different kind from that created by researchers. Moreover, in some professions nearly all new practice is both invented and developed in the field, with the role of academics being confined to that of dissemination, evaluation and post-hoc construction of theoretical rationales. In others, knowledge is developed by practitioners ‘solving’ individual cases and problems, contributing to their personal store of experience and possibly that of their colleagues but not being codified, published or widely disseminated (Eraut 1985, p. 129).

It is now widely acknowledged that a range of professional innovations and organisational knowledge emerge from professional practices and problem-focussed design activity rather than developmental work driven by basic research. Knowledge creation, innovation and transformation capacities have been seen as important qualities of successful practitioners and organisations (Argyris and Schön 1996; Engeström 2008; Nonaka 2004).

Some professions, such as architecture, engineering or computer programming, claim that such knowledge-building work is a part of everyday practice (Ewenstein and Whyte 2009). Other professions try to create similar practical knowledge, by trying to render current practices into codified forms that have the status of “knowledge” (Falconer and Littlejohn 2009; Goodyear and Steeples 1998; Szymanski and Whalen 2011). The nature and form of knowledge that emerges from practice-based innovation is different from the normative accounts of scientific knowledge; and the process through which such practical knowledge is created is distinct from the orderly systematic knowledge creation processes that underpin normative models of inquiry for producing scientific theories.

It is often assumed that practical innovation and knowledge-creation largely rest either on chance or on substantial amounts of experience. The ability to help transform an organisation’s ways of working therefore depends on skills which are hard to acquire and knowledge that cannot be expected of a new recruit to the profession. Nonaka and Takeuchi (1995) and Nonaka and Toyama (2007) suggest that innovation depends on the conversion of knowledge from tacit to explicit. Such knowledge gets created through continuous social interaction, and is articulated, codified and made available for use in other settings.

Bereiter, Argyris, Schön, Engeström and others suggest that knowledge creation might be a more mundane activity, not very different in kind from individual, group and organisational learning (Argyris and Schön 1996; Bereiter 2002; Engeström and Sannino 2012; Miettinen and Virkkunen 2005). On this view, knowledge creation can guide learning and be learnt (e.g. Bereiter 2002; Paavola et al. 2004).

While the theoretical starting points for these various authors differ significantly (see e.g. Engeström and Sannino 2010), they nevertheless share a common position with respect to the idea that knowledge is not only the property of an individual mind, but is also embedded in mediating or conceptual artefacts (such as plans, theories, ideas and models).

Learning could be understood as a collaborative effort directed toward developing some mediated artefacts, broadly defined as including knowledge, ideas, practices, and material and conceptual artefacts. The interaction among different forms of knowledge or between knowledge and other activities is emphasised as a requirement for this kind of innovativeness in learning and knowledge creation (Paavola et al. 2004, pp. 569–570).

Some kinds of knowledge-building products have a “tool like” character. They are not only a solution to a specific problem, and not only a product of knowledge use. They both use knowledge and extend it. Such tools might be created for a person’s own future use; they might also be shared, tweaked and integrated into new assemblages, reused and improved. A classic example of this kind of professional knowledge and knowing can be seen in software engineering, particularly in open source communities, where people build on each other’s program code (Nerland and Jensen 2010). It is also observable in less mundane cases, where professionals come together to solve distinct shared problems encountered in their work to create new procedures, standards or other elements of infrastructure that make shared work possible (Engeström 2008; Miettinen and Virkkunen 2005; Virkkunen and Ristimäki 2012; Star and Griesemer 1989; Star 1989).

We now turn to outline a fifth perspective – one which we have not so far seen documented in the main body of literature on professional learning, though it has some roots in anthropological research into the nature of skill, perception and practice.

4.7 From Rational Thought and Embodied Material Skill to Grounded Professional Knowledge

In a recent paper, Jean Lave (2012) draws on Tim Ingold’s (2000) distinction between “*technology, language and intelligence*” and “*craftsmanship, song and imagination*.” Lave is talking about practice in general, but we think the distinction can be particularly powerful in thinking about the nature of professional expertise, as a counterweight to the mainstreams of cognitive science research on expert knowledge.

neo-Darwinian biology, cognitive science and psycholinguistics have conspired to produce an extremely powerful approach to understanding the relations, in human evolution, between technology, language and intelligence. ... Suppose, to pursue my alternative claim, that we set ourselves the task of examining the relation, in human evolution, not between technology, language and intelligence, but between craftsmanship, song and imagination. The resulting account, I suspect, would be very different (Ingold 2000, pp. 406–407).

Ingold’s writings on craftsmanship are strong on the notion of embodied skill, vividly tracing the perception-action loops that enable the skilled person to work with subtle variations in materials and adjust to subtle changes in the world, more generally. Many of Ingold’s examples come from his anthropological research and describe what might seem esoteric skills traditional within remote communities.

But he also speaks of craftsmanship in ways that illuminate discursive work in professional settings. For example,

We ‘feel’ each other’s presence in verbal discourse as the craftsman feels, with his tools, the material on which he works; and as with the craftsman’s handling of tools, so is our handling of words sensitive to the nuances of our relationships with the felt environment (Ingold 2000, p. 411).

Of the four accounts of professional knowledge and knowing sketched above, two emphasise “thinking” or “reasoning” like a lawyer (doctor, engineer, etc.) (views 1 and 4) and two emphasise “acting like” a lawyer (doctor, engineer, etc.) (views 2 and 3). In short, the literature tends to the view that expertise is either strongly associated with thinking, reasoning and the mind or deeply embedded in skills, dispositions and the material context. It is as if there is a Cartesian divide between knowledge and skill, mind and context. Then again, there is a contrast between views which privilege rational thought and fine-tuned, embrained skills (on the one hand) and views which imply that social and material context and practices matter more than minds and brains (on the other hand).

In contrast, we want to take seriously the mind and practice, and also the body (in which the brain and mind are embodied) and contexts (in which practices are embedded). Mind, body, perception, action and matter all matter. From this perspective, knowledge and knowing involve fine-tuned coordination: “thinking like”, “acting like”, “seeing like” and “touching like” a professional.

Though Goodwin’s (1994) writing focuses on professional discourse, his notion of “professional vision” can help us advance a more general argument.

Discursive practices are used by members of a profession to shape events in the domains subject to their professional scrutiny. The shaping process creates the objects of knowledge that become the insignia of a profession’s craft: the theories, artifacts, and *bodies of expertise* that distinguish it from other professions. Analysis of the methods used by members of a community to build and contest the events that structure their lifeworld contributes to the development of a practice-based theory of *knowledge and action* (Goodwin 1994, p. 606, our emphasis).

Goodwin focuses on three distinctive professional practices:

(1) *coding*, which transforms phenomena observed in a specific setting into the objects of knowledge that animate the discourse of a profession; (2) *highlighting*, which makes specific phenomena in a complex perceptual field salient by marking them in some fashion; and (3) producing and articulating material representation. By applying such practices to phenomena in the domain of scrutiny, participants build and contest *professional vision*, which consists of socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group (Goodwin 1994, p. 606, original emphasis).

Goodwin offers a clear statement that human knowing and action are not limited to language, but are “constructed by assembling diverse materials” including language, prosody, visible embodied displays, tools, and material environments. In short, the focus of expert knowing shifts from cognitive operations – what is in ones’ mind – to fluent use of semiotic and material tools, body and environment (Goodwin 2013).

For example, Hindmarsh and Pilnick (2007) have studied the skilful interweaving of professional action among anaesthesia teams during operations. Their descriptions capture our point about professional knowing as entailing the coordination of seeing, feeling and action.

The tight coordination of action among the anaesthetic team of anaesthetist and ODA [operating department assistant] rests on an intimate understanding of the possible trajectories of delicate shifts in bodily conduct by both anaesthetist and ODA – treated as indicating the need for assistance and the availability of help. Moreover, the resources for the two colleagues to assist are not simply verbal, or even a combination of the verbal and the visual, but rather bring together verbal, visual and tactile resources. The import of tactile knowing in the production, and moreover the interactional organization, of work practice is often overlooked and yet this fragment highlights the critical resource that touch, in the form of finger pressure on a colleague's hand, provides for the anaesthetist in organizing and coordinating the conduct of her colleague (Hindmarsh and Pilnick 2007, p. 1408).

This knowing is not to be mistaken for a shapeless, moment-to-moment improvisation by the anaesthesia team. Rather, it is an intelligent fine-tuned coordination of manual and perceptual skills with deep understanding of what is happening now and what comes next.

Knowing the scene rests on understanding the character and sequence of action in the anaesthetic room and recognizing a 'trajectory of action' that he can contribute to. ... In addition, as he does not explicitly request the instrument, the anaesthetist can be seen to expect or rely on the ODA knowing what comes next and that he will pass the instrument at just the appropriate moment. However, the timing of the instrument being passed is not all that is relevant here. Indeed the way in which the ODA presents and positions the different instruments to the anaesthetist displays understanding of the other's prospective embodied conduct as well; that is to say, through the manner of the passing of the instrument the ODA displays a sensitivity to what it takes to use a laryngoscope and later to insert a tracheal tube (Hindmarsh and Pilnick 2007, p. 1404).

This richer, more extensive view of knowledge and knowing (as revealed in perception and action) is nicely captured by both Ingold (2011) and Del Mar (2010).

it is in the very 'tuning' of movement in response to the ever changing conditions of an unfolding task that the skill of any bodily technique ultimately resides (Ingold 2011, p. 46).

Each of our senses – and also the numerous different complexes of them (e.g., hearing-touch) – are skills that can be (perhaps infinitely) improved. Each does already, and can ever more (if it is trained), contribute to our understanding; indeed, understanding consists, *at least to a large extent, in the intelligence of the senses* (Del Mar 2010, p. 1, our emphasis).

Thinking about pedagogical implications of this fifth view, Del Mar (2010, 2011) provides the best example we know of an interpretation of professional education (in the law) that reflects Ingold's "craftsmanship, song and imagination".

students must be given the opportunity to experience the making of such judgements, i.e., of having such experiences as 'Ah, I see that', or 'Ah, I see that as.' They also need to come to understand the dynamics of legal knowledge, i.e., that the rules themselves do not delimit or determine anything. What is vital is the activity of seeing, and thus also respecting the potentiality of any rule or any image. It is not students that are 'stupid' if they cannot make the judgement that we want them to make: it is we, the teachers, who are failing to provide them with the right conditions for making judgements for themselves (Del Mar 2010, p. 15).

We return to some practical implications for professional education shortly. Just before doing so, we need to make one final pass over the question we asked at the beginning: what is knowledge?

4.8 What Is Knowledge, Revisited: Dynamic Knowledge, Grounded Concepts and Embodied Epistemic Environments

Much of the intellectual space mapped by people who study professional knowledge involves theoretical accounts in which the mind has a non-trivial role. Accounts of what the mind is, how it contributes to intelligent performance, how it learns and can be taught, and how it becomes capable of innovation are therefore very salient. Various conceptualisations of professional knowledge have aimed to propose how professionals *think in action* and *in context*, but not all of them – indeed rather few – have provided explicit accounts of how actually the *mind works, changes and relates* to skill, movement, and social and material context. Some scholars write about expertise from a strong psychological perspective can be accused of adopting rather rationalist views of mind (Chi et al. 1988; Clark 2008; Ohlsson 2011). As a rule they draw a clear division between “higher order” conscious thought (cognition, metacognition) involving abstract, systematically organised knowledge constructs (concepts, theories, schemas, etc.), and “lower order” cognitive operations (senses, perception, actions, emotions, etc.) which provide an interface with the external world. On this view, the “higher order” capabilities do the real intellectual work, the rest are mere inputs for rational expert thinking.

Some scholars who have tried to give a more central role to environment, and the human senses, in professional work have turned away from mentalist models of cognition, but in so doing have also turned away from serious consideration of a psychological basis for human knowing in general. As a rule, they have dismissed the central role of concepts, theories and other systematically organised knowledge constructs as a basis for expertise, but have said relatively little about what kinds of alternative mental elements and processes may underpin experts’ thinking and performance.

In our view, it is time to find a rapprochement – one that gives due weight to mind and context and which acknowledges the dynamic nature of human intellect and its dependence on grounding in experiences and environments (Barsalou et al. 2007; Barsalou 2008; Hutchins 2010; Smith 2005; Smith and Sheya 2010; Smith and Thelen 2003). In the space remaining, we can only offer a sketch of three core facets of this perspective: (a) how knowledge emerges; (b) the nature of conceptual knowledge; (c) how the environment supports knowing. The interested reader will find a more extensive treatment in Markauskaite and Goodyear (forthcoming).

4.8.1 How Knowledge Emerges: Intelligent Action as Coordinated Cognition and Non-cognition

Traditional modal theories of cognition commonly focus on stability and rational logical behaviour, but intelligent professional action requires not a stable repetition of behaviour, but coherence and flexibility in responding to a changing world. Smith (2005) notes that a traditional way to explain stability in behaviour across situations or over the time was to look for stability in the mind and especially for one central unit that could coordinate all actions. Typical resources for such stability are things like “concepts” and other relatively firm mental representations – theories, mental models, beliefs, frameworks, etc. – that guide behaviour, but exist independently of perception and action. In contrast, Smith argues that much of the apparent stability in human behaviour emerges from the variability and coupling of individual elements distributed across the mind, the body and the world. Smith illustrates this with an example of a cat’s locomotion:

cats walk backward, forward, on grass, on hills, on rubble. They side step objects; they walk when one limb is in a cast. The alternating limb pattern is apparent in all these cases but the variability to make this same pattern is remarkable (Smith 2005, p. 280).

An apparently stable pattern of alternating limbs when the animal moves through terrain cannot be explained by the existence of a stable central “pattern generator” that is capable of producing similar, alternating movements of four limbs. Variability in the movements is essential and extraordinary – as each move requires very different muscle firing to keep the general pattern of limb alternation stable when the cat moves across real terrains.

Smith claims that such apparently stable behaviour can best be understood as a dynamic system – there is no one central control mechanism that has a causal priority (be it a stable concept, theory or plan). An apparently coherent pattern emerges from the interaction and self-organisation of many elements of the system – from the coordinated relationships among diverse components distributed across mind, body and world.

The intelligence that makes alternating leg movements is not strictly in the brain, not in the body, nor the world but in interaction of a particularly structured body in a particularly structured world (Smith 2005, p. 286).

Empirical research is providing more evidence to support this view, demonstrating that creativity, anticipation and intuition are not just a result of independent processes created by a mind; they emerge from the interactions among many other basic systems in the brain, such as perception, goal management, action, motivation, emotions, and learning (Barsalou 1999).

Humans probably learn important things more often through social interaction than they do from isolated individual interactions with inanimate stimuli. Furthermore, these socially acquired skills are intrinsic to coordinated activity in division-of-labour settings, and also in competitive activity in conflict situations (Barsalou et al. 2007, p. 82).

This view shifts the focus of what is central in knowledgeable performance from stable constructs that can (ostensibly) control knowledgeable actions (stable concepts, theories, mental models, etc.) to rich relationships and interactions between elements of a system that spans mind, body and world.

4.8.2 Grounded Concepts: Situated Knowing and Non-situated Knowledge

What then is the role of concepts, theories and other similar well organised knowledge constructs that have commonly played a role in defining professional knowledge bases and in organising programs of professional education? A grounded cognition view suggests that mental representations (i.e., conceptual knowledge) do have a central role in human cognition (Barsalou 1999, 2009). However, this conceptual system is *unlikely* to be composed of abstract self-contained elements operating in a closed system independently from the external world and experiences. Cognition is embedded in actions and the physical world and this world is the main source of resources from which humans construct and organise their conceptual systems. Along these lines, Barsalou (2009) proposes an alternative view of the human conceptual system and argues that human conceptual knowledge is inherently situated and grounded in experiences. He shows how human conceptual knowledge remains tightly linked with background situations, experiences and actions.

viewing a picture of a manipulable object (e.g., HAMMER) for a few seconds and naming it does not simply activate visual and linguistic areas, it also activates the grasping circuit in the brain, indicating that the brain is preparing for situated action with the object (Barsalou 2009, p. 250, in which he draws on Chao and Martin 2000).

According to this view, conceptual categories are stored with at least four types of situated information: (a) selected properties of the conceptual category relevant to the situation; (b) information about the background settings; (c) possible actions that could be taken; (d) perceptions of internal states that one might have experienced during previous encounters with the conceptual phenomena, such as affects, motivations, cognitive states and operations. Such a conceptual system is not abstract and detached from the situated experiences, rather it is grounded in perception and “constructs situated conceptualizations dynamically, tailoring them to the current needs of situated action” (Barsalou 2009, p. 251). These “conceptual packages” prepare humans for situated action and guide goal-directed activity. Multiple modalities of the phenomena experienced in the world via vision, touch, smell, audition, emotion, etc. are an integral part of knowledge representations and processes through which knowing becomes possible. Such conceptual understanding is not organised around abstract categories, but around the interface between perception and action – understanding the concept is “being there conceptually”.

4.8.3 *How Environments Support Knowing: Embodied Epistemic Environments and Professional Knowledge Work*

This grounded view of conceptual knowledge gives us an insight into why professionals find it so hard to bridge between the conceptual knowledge learnt in university settings and the practical problems encountered in workplaces. It is unlikely that gaps between “knowledge to understand” and “knowledge to do” create these difficulties. Rather, disconnections between the contexts and situations in which the “theoretical concepts” are learnt and the “practical concepts” are encountered cause the “conceptual divisions”. Students do not “see” learnt concepts as professionals do, because educators and employers rarely succeed in creating conditions that allow students to ground concepts in situations that fuse theoretical and practical professional experiences.

What kind of environments may be productive for learning grounded conceptual knowledge and taking knowledgeable action informed by theoretical understanding? Clark (2011) and many others (e.g. see Hutchins 1995, 2010; Nersessian 2012) point to the mutual role of environment, language and embodied interaction, not only for situating, but also *for enhancing* intelligent mind-body-world connections.

the linguistic tools enable us to deliberately and systematically sculpt and modify our own processes of selective attention” (Clark 2011, p. 48); “the intelligent use of space and the intelligent use of language form a mutually reinforcing pair, pursuing a common cognitive agenda (Clark 2011, p. 65).

The environments of human thinking are not “natural” environments. They are artificial through and through. Humans create their cognitive powers by creating the environments in which they exercise those powers (Hutchins 1995, p. 169).

Ingold (2000) prompts us to make one further step beyond the initial contact between “learning to understand” and “learning to do,” and look into how this relationship may evolve with practice:

The novice becomes skilled not through the acquisition of rules and representations, but at the point where he or she is able to dispense with them. They are like the map of an unfamiliar territory, which can be discarded once you have learned to attend to the features of the landscape, and can place yourself in relation to them. The map can be a help in beginning to know the country, but the aim is to learn the country not the map (Ingold 2000, p. 415).

However, if we step beyond the territory of *established* professional practices into the territories that are occupied by pioneering “knowledge workers” then we have quite a different learning challenge. The features of the landscape should be discovered, and the map should be created, simultaneously. Andy Clark’s (2011) reminder about the central role of language (and symbolic artefacts) in experts’ simultaneous self-engineering of the mind and environment gives us an opportunity to make this further move in the argument:

Coming to grips with our own special cognitive nature demands that we take seriously the material reality of language: its existence as an additional, actively created, and effortfully maintained structure in our internal and external environment. From sounds in the air to inscriptions on the printed page, the material structures of language both reflect, and then systematically transform, our thinking and reasoning about the world. ... Linguistic forms and structures are first encountered as simply objects (additional structure) in our world. But they then form a potent overlay that effectively, and iteratively, reconfigures the space for biological reason and self-control. The cumulative complexity here is genuinely quite staggering. We do not just self-engineer better worlds to think in. We self-engineer ourselves to think and perform better in the worlds we find ourselves in. We self-engineer worlds in which to build better worlds to think in. We build better tools to think with and to use these very tools to discover still better tools to think with. We tune the way we use these tools by building educational practices to train ourselves to use our best cognitive tools better (Clark 2011, p. 59).

This richly recursive conception of “self-engineering” provides both resources and challenges for those involved in rethinking professional education.

4.9 Concluding Comments: Some Practical Implications

As we said at the start of the chapter, preparation for the professions is bedevilled by confusions about the nature of capability in the workplace, and about how an appropriate blend of academic and workplace experiences can be crafted so as to overcome some of the problems recognised by employers, academic teachers and students alike. Employers typically push for longer periods of practical experience (though not at their own expense). Academic teachers want to make sure that students are trained for the uncertainties of future practice, arguing that workplace readiness is not enough. Students juggle what seem to them to be conflicting priorities – emanating from a clash of cultures between academia and the workplace. A deeper analysis of the capacities that distinguish effective, innovative professional workers from novices or the hidebound can provide *part* of the solution. We end by mentioning a few implications of the analysis provided above.

One of the key implications of the grounded account of knowledge and knowing is that perception and action are inseparable from, and equally important as, processes in the mind. So professional education cannot be solely concerned with processes in the mind nor solely with actions in the world. It must embrace the coordination of what the mind does with perception and action. If we believe in the usefulness of propositional knowledge in knowledgeable action then the educational challenge becomes how to link the “grammar” that underpins these theoretical constructs with the multi-modal experiential constructs on which human cognition naturally operates. In short, the focus of attention has to shift from knowledge (concepts, theories) and skill (perception, action) to the constructs, processes and environments for *coordinating* mind-body-world experiences – constructs for knowing, for conceptually perceiving, for intelligently sensing.

If we take multiple modalities seriously, then there is no sense in trying to decide which of the five accounts is right, or best. All are needed for a comprehensive

account of professional knowledge. If one takes a grounded view, and the notion that much conceptual knowledge is organised around the interface between body-world, perception-action, and coordination, then it is extraordinary that neither higher education nor employers do much to enable the learning of *actionable (conceptual)* knowledge, i.e., making concepts grounded; “*educating*” “*conceptual perception*” in action, in the material environment, in the cultural environment, etc. Constructing productive learning-epistemic environments is key. And – if we are serious about seeing professionals as innovating knowledge workers – developing graduates’ capacities to construct congenial environments for their own epistemic work is also vitally important.

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Chapter 5

Conceptions of Professional Competence

Martin Mulder

Abstract Professional and practice-based learning is a process which manifests itself in many different forms. It differs by personal characteristics of the learners, levels of their professions, fields of practice, intentionality of their learning, and formalisation of the learning activities. Notions of competence have entered this diverse practice in many ways. The question is whether conceptions of professional competence have helped the practice of professional and practice-based learning. In this chapter it is argued that this is indeed the case. Although various attempts to implement competence-based professional learning programmes were heavily criticized, later developments in competence theory and research gave new insights which emphasized the integrative meaning of competence within professional practice. It helped in mapping professional fields from a domain-specific as well as a generic behavioural perspective. This chapter goes into the roots of the competence movement, and evaluates the contributions of these to the field of professional and practice-based learning. This is further illustrated with examples of different professions in which competence models have been and still are an effective means to map requirements for professional practice and to guide the evaluation and development of professional and practice-based learning programmes. What worked and did not work is then explained by distinguishing three approaches of conceptualizing competence which have been used in different contexts, and which have wide implications for professional and practice-based learning. The chapter concludes with the claim that current competence conceptions help mapping, focusing and assessing professional and practice-based learning.

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5.1 Introduction

The concept of competence is probably as old as humankind. Homo sapiens have always been desiring to master skills and to find ways to solve practical, professional and scientific challenges. Certain individuals always received the prerogative to perform certain activities which had a highly symbolic meaning. The attribution of authority was originally strongly related to tradition but that gradually moved to cognition and ability. In the current meritocratic society, people are generally allocated to jobs based on educational achievement and their profile of capabilities and other personal characteristics. The drive of individuals to learn to perform in certain fields of activities, however, never changed, and is to a large extent based on eagerness to master certain skills, become independent and get recognition. This is very well visible in babies and toddlers when they want to turn in their cradle, crawl on the floor and walk in the room, stimulated by their parents who are cheering when the first steps are taken. Young children constantly move around until they are able to do what they desperately want at the end of the day: to gain independence; or: to become competent. For gaining an independent position in society nowadays, individuals need to pass through formal education trajectories and complete examinations. The higher the education levels students achieve, the higher their chances of getting a good position at the labour market and an appointment in a better-paid and stable job. Independence, however, is a relative notion. In society, people are interdependent by definition, but individual ego development is necessary for getting a personal identity in the first place and a professional identity later in life, for which recognition is needed, by getting an appropriate education qualification, and subsequently by being appointed in a job, being promoted, rewarded, and having a career perspective. Development opportunities are often the top priority of graduates from higher education and considered to be a major labour condition. Because of the massification of education, it has become an industry. And because of its limited innovation capacity, it somehow alienated from society. Getting a diploma became a goal in itself, many educational institutions were not well-aligned to societal demands anymore, and became pedagogical islands. Sometimes, this process is called the ‘diploma disease’. Yet, it can also be named the ‘competence crisis’,

as the big issue was whether graduates who were qualified really were able to perform according to standards in the profession and expectations in the working situation. Having a college degree was no guarantee for being able to perform well on the job or in society.

The disconnection between education and the labour market was the main cause of the competence movement (Grant et al. 1979). Therefore, professional associations began to articulate performance requirements and develop competence profiles with which candidates had to comply to enter the profession. Educational institutes reworked their curricula to adjust them to what was expressed as being important by professional associations and industry organisations. However, as the concept of intelligence, the concept of competence was multi-dimensional, and various conceptions of professional competence emerged. Sometimes, the concept was praised and, at other times, it was cursed because of the differences between its intrinsic meaning, quality promises and disappointing application and results (Mulder 2011). Nevertheless, at present, the concept of competence is institutionalized, for instance in the European Qualification Framework, and, thereby, in national qualification frameworks of EU member states, where competence is seen as the ability to apply knowledge and skills at a certain level of independency and autonomy (Mulder 2012). It is also used in education or training profiles for certain professional groups such as medical specialists, and in the design of educational programs, especially in vocational education and training. Although these applications are quite straightforward, different theoretical insights have developed, which contradict one another on several dimensions. Certain authors stress the importance of the integral nature of the concept of competence, while others separate knowledge, skills and attitudes. Another major issue is the distinction between competence-oriented and competence-based education which has major implications for the extent that principles of competence development are implemented in education programs.

In this chapter, the concept of competence is placed in the context of professional and practice-based learning. This learning is a process which manifests itself in many different forms. It differs by personal characteristics of the learners, levels of their professions, fields of practice, intentionality of their learning, and formalisation of the learning activities. Notions of competence have entered this diverse practice in many ways. The main question in this chapter is whether conceptions of professional competence have helped the practice of professional and practice-based learning. In this chapter it is argued that this is indeed the case. Although various attempts to implement competence-based professional learning programmes were heavily criticized (Mulder et al. 2007b; Weigel et al. 2007), later developments in competence theory and research gave new insights (Biemans et al. 2004) which emphasized the integral meaning of competence (Wesselink 2010) within professional practice. It helped in mapping professional fields from a domain-specific as well as a generic behavioural perspective. This chapter goes into the roots of the competence movement, and evaluates the contributions of these to the field of professional and practice-based learning. Examples of competence models will be given; these models have been and still are an effective means to map requirements for professional practice and to guide the evaluation and development of professional

and practice-based learning programmes. What worked and did not work is then explained by distinguishing three approaches of conceptualizing competence which have been used in different contexts, and which have wide implications for professional and practice-based learning.

To link the concept of competence to professional and practice-based learning, the chapter commences with a review of the historical roots of the concept of professional competence, which are related to competence *motivation*, human *intelligence*, professional *performance* and professional *education*. This description will show that the concept of competence was used in the context of learning and performance from the outset, and that competence and professional and practice-based learning are intrinsically related to one another. The next section, on competence and professions, will make that even clearer. Various professional fields are selected, in which competence profiles have helped to improve professional and practice-based learning in terms of learner assessment, selection, education, training and development. The fields which are selected are *management*, *human resource development*, *medicine*, and *purchasing*. This selection is not meant as being complete but serves as an example of ways in which the competence movement has entered professions and professional development. This section is concluded with a description of an attempt to capture all competence in one behavioural competency framework, which can be used for implementing processes for professional and practice-based learning and self-reflection and development.

The link between competence and professional practice however differs by the way in which competence is defined. Three broad approaches of competence and professional development are distinguished here: (1) Competence and behaviouristic functionalism, which stresses the importance to specifically determine the discrepancies between actual and desired competence, leading to training of sometimes miniscule skills; an important pitfall of this approach is fragmentizing learning; (2) Competence as integrated occupationalism, which is visible in the present qualification frameworks and competence-based education approaches in which it is stressed that knowledge, skills and attitudes should be integrated in the curriculum, teaching, learning and testing; (3) Competence as situated professionalism, which indicates that competence only gets meaning in a certain context; an important pitfall here is holism, when details of competence are covered under generic expressions of abilities of people, which may be sufficient in personal development processes, but not for professional certification purposes (Mulder 2011). Although these three different approaches have distinct implications for professional and practice-based learning, we contend that in all three there are strengths and weaknesses, and that they can be combined in practice. The optimum mix depends on the purpose and the specific context of the professional learning, which can vary from learning to change winter tyres to leading an open heart surgery team. Related to the latter, there is another fundamental difference in the relationship between competence and professional practice which has important implications for professional and practice-based learning, which is the difference between generic competence and task-oriented competence. An example of the first is the communication capability of a medical expert, whereas an example of the second would be the

ability to make the right diagnosis given a series of certain medical examinations. Again, we contend that both are important in professional practice and for professional and practice-based learning.

The chapter concludes with the claim that current competence conceptions help mapping, focusing and assessing professional and practice-based learning. But first we go into the meaning of the concept of competence.

5.2 What Is Professional Competence?

Professionals are competent when they act responsibly and effectively according to given standards of performance. They are held to possess sufficient competence. Professional competence is seen as the generic, integrated and internalized capability to deliver sustainable effective (worthy) performance (including problem solving, realizing innovation, and creating transformation) in a certain professional domain, job, role, organisational context, and task situation.

Competence consists of various competencies. A competency is a part of generic competence; it is a coherent cluster of knowledge, skills and attitudes which can be utilized in real performance contexts. For instance, in a crime scene investigation a forensic expert needs to produce a DNA profile of a piece of evidence. This requires knowledge (e.g. disciplinary knowledge), skills (e.g. working with artefacts) and attitudes (e.g. accuracy, coping with pressure, integrity). Together these constitute professional competence. To take another example, traders at a flower auction require knowledge (about the products, quality indicators, market developments, prices), skills (e.g. multi-tasking, processing information, instant decision making), and attitudes (stress-tolerance, feeling for sales). These are elements of professional competence as well.

What has not yet been discussed often is the twofold meaning of competence in terms of capabilities and rights. These two are different, yet go together. Competence as capabilities is the field professionals feel comfortable with. Because of their education and experience in practice they have gained a certain level of competence, which goes together with a feeling of confidence, self-efficacy and professional identity. But educational institutions have declared graduates to be competent by approving their completions. The diploma is the formal piece of evidence of the competence level of the graduate, which is nowadays more transparent because of the education levels specified in the European Qualification Framework and printed on diplomas or in diploma supplements. Professional associations also declare individuals as competent when they comply with certain standards. Educational institutes and professional associations have the right to do so if they are acknowledged by the relevant institutions. We can also say that educational institutions have the competence to take decisions regarding the licensure of candidates who complete educational programs. Other institutions may have other rights, such as law courts and European institutions. Examples of institutional competencies of law courts were already described in the dissertations of Viruly (1890) and Roes (1885) at the

University of Leiden in the Netherlands. (Both dissertations counted 31 and 41 pages respectively). Individuals who have received a professional licence of an educational institute or a professional association, or the state, also have certain rights to act (e.g. as teacher), perform interventions (e.g. as medical expert), and take decisions (as lawyer). Citizens also have their rights (e.g. to vote, to raise children, to move in freedom), but if there are grounded reasons to do so, the legal system can also deny these rights by declaring people incompetent.

The meaning of competence discussed above is mainly related to professional competence, as used in key competencies, competence domains, competence clusters, enabling competencies, and competency dimensions or competency components. However, there is also a branch of literature in which organizational competence is being discussed. The most prominent source of this is probably the work of Prahalad and Hamel (1990) on the core competence of organisations. Core competencies are capabilities of organisations in which they excel, with which they earn most of their profits, and which cannot easily be copied by competitors. This is an interesting line of research, and at organisational level core competencies should be included in the corporate strategy, which should be aligned with corporate human resources management strategy, which in turn should be related to the corporate competence development strategy.

The relationship between competence and professional performance is complicated. There are multiple connections between the two at various levels of aggregation and relationships between detailed competencies and specific performance results are not exclusive. Utilizing criterion differentiation and canonical correlation in the search for common dimension of competence and performance as suggested by Bartram (op cit.) is nevertheless useful.

5.3 Theoretical Notions Regarding Competence and Competence Development

Historically, there has been a close link between the concept of competence and professional practice. This already appears from the work of Dewey (1916), who used the term various times in his book 'Democracy and Education'. Examples are: 'Translated into specific aims, social efficiency indicates the importance of industrial competency. Persons cannot live without means of subsistence' (p. 125), 'A democratic criterion requires us to develop capacity to the point of competency to choose and make its own career' (p. 119), 'It is, of course, arbitrary to separate industrial competency from capacity in good citizenship' (p. 68), and 'But there is a great difference between a proficiency limited to immediate work, and a competency extended to insight into its social bearings; between efficiency in carrying out the plans of others and in one forming one's own' (Dewey 1916, p. 214). From these citations, it appears that Dewey saw competency as the general public did, as the ability to create a livelihood, but also as the minimum requirement to enable the pursuit of an independent career that is chosen in freedom, the broad mastery

of professionalism which needs to be related to citizenship, which enables people to participate in the democratic society and a vocation or profession in a self-determined way.

Citations like these can be found in more places in publications in the early twentieth century, such as in the report of Childs (1910). This report is of a delegation of agricultural education experts from the United Kingdom who went to the USA and Canada in the first decade of the 1900s. They studied agriculture and agricultural education in those countries in different places, and prepared a report in which they, as Dewey, used the concept of competence in various ways. The most meaningful quotes are about the following issues: ‘... competence of professionals (i.e. farmers), competence in professional tasks and responsibilities (e.g. manual farm operations), competence in professional practice (e.g. scientific agriculture), competence of teachers and competence of researchers as teachers, competence of assessors, competence management (e.g. enabling and securing good working conditions), and last but not least: incompetence of all mentioned above’ (Mulder and Pachau 2011, p. 397).

These examples show the early concerns with the competence of students in, graduates of, teachers in and administrators of education, or the level of their professional knowledge in practice. However, in these writings competence development was not yet a professional practice in itself. It took nearly half a century for the concept of competence to move beyond general use and to enter the literature as a concept that was being studied as a theme.

5.3.1 Competence and Motivation

As far as we know White (1959) was the first to introduce the concept of competence in the psychological literature on motivation and then to conceptualise it as a key notion to explain behaviour. Until that time, the use of the concept was not thematic but more instrumental, and related to day-to-day use of it. White voiced the discontent with personality psychology of Freud and others in which ‘drives’ were perceived as being the central concept by which human behaviour could be explained. Instead, he proposed ‘competence’ as the central concept by which he meant ‘...an organism’s capacity to interact effectively with its environment.’ (op cit., p. 297). He believed that competence in human beings was not the result of a natural maturation process, but that it ‘... is slowly attained through prolonged feats of learning’ (op cit., p. 287). White (1959) provided examples from biological experiments and underlined research that showed that behaviour motivation is much more complex than responding to certain drives. For instance, he mentioned research from which it appeared that dogs which need certain nutrients are going to search for specific food that contains these, and hormone levels in lead to more complex sexual behaviour than was accounted for in the theories of drive-reduction, insights that were breakthroughs in the fifties of the last century. After various other examples from general psychology and child psychology he proposed to conceive

of competence as a 'motivational concept'; '... there is a *competence motivation* as well as competence in its more familiar sense of achieved capacity.' (op cit., p. 318). White (1959) called the motivation to become competent 'effectance'. He did not believe that drives were not sufficient to explain activities that are carried out to become competent. 'Such activities in the ultimate service of competence must, therefore, be conceived to be motivated in their own right. It is proposed to designate this motivation by the term effectance, and to characterize the experience produced as a feeling of efficacy' (op cit., p. 329). This line of thinking still prevails in current debates on competence. Children, students and professionals in general are motivated to learn to understand more or less complex phenomena and master certain skills to make the able to effectively function in their environment. To capture this motivation in education, performance motivation tests were developed, which included tests on failure anxiety, which appeared to be a major barrier for in making educational tests and education achievement in general. When a problem is complex or a performance situation is demanding, becoming competent and, thus, confident that one understands the problem and can effectively perform in a given situation is rewarding, and still seen as self-efficacy (Bandura 1977).

The insight of competence being performance motivation has been essential in the field of learning in general and professional learning in particular. It is helped to understand that without performance motivation, or the will to master a certain level of professional skill, there would be no professional learning at all.

5.3.2 *Competence and Intelligence*

Next to motivation, intelligence was another central concept by which behaviour was explained. The criticism of this concept has also been severe, and was aimed at disputing the invariability and one-dimensionality of it, which ultimately resulted in the notion of multiple intelligence (Gardner 1983). If competence is seen as being able to effectively interact with the (social and intellectual) environment and the result of intensive and continuous learning, professional education has to obviously prepare for that. To do so, curricula need to be adjusted to essential competence domains, teaching and learning materials need to be in place, teaching staff need to be prepared to implement these curricula, and educational tests need to be aligned to the curriculum and course objectives, course content and learning tasks. However, McClelland (1973) stated that education was testing more for intelligence than for competence, whereas intelligence tests did not predict job success very well. He cited a work of Thorndike and Hagen (1959) in which 12,000 correlations were reported of more than 10,000 respondents. That study showed that the relationship between aptitude testing and job success was insignificant. He also cited work of other researchers like Berg (1970) and Taylor, Smith and Ghiselin (1963) who demonstrated that job performance and educational success were poorly related. McClelland suggested that educational tests should be based on competence: 'How would one test for competence, if I may use that word as a symbol for an alternative

approach to traditional intelligence testing?’ (op cit., p. 7). More specifically, he proposed the following competence-oriented testing principles (op cit., pp. 7–12): (1) Use criterion sampling; (2) Test change in what has been learned; (3) Make publicly and explicitly known how one can improve on the characteristic that is tested; (4) Competencies which are part of ‘clusters of life outcomes’ should be sampled and included in assessments; (5) Tests should not only rely on asking responses on clearly defined problem statements but also on vague instructions as real-life situations are in most instances not well-structured (this distinction is named ‘respondent’ versus ‘operant’ behaviour); (6) Item sampling should be aimed at operant thought patterns, as these are more general and of a higher level than small skills, and therefore enable better generalization.

So, whereas White (1959) was emphasizing the importance of the motivation to learn and to perform, McClelland (1973) was stressing that assessment of learning needed to be more relevant. It should go beyond the measurement of small skills, which does not have sufficient predictive validity for life and job success. This emphasis has direct implications for the design of professional education and professional development. Next to motivation, appropriate assessment was seen as essential for the preparation of graduates for the world of work.

5.3.3 *Competence and Performance*

Next to motivation and assessment, there was another influential development which tried to link systems thinking and learning with competence and performance. Commencing in the 1960s, the movement of performance improvement grew which was not only aimed at explaining behaviour, assessing competence, and training and development, it was dedicated to productivity improvement and performance in practice. The systems approach implied that it was insufficient to look at individual behaviour. Instead, workplaces with their group dynamics, work units with their organisational constellations and people management policies and practices, organisations themselves in their environment and societal context were conceptualized as mutually dependent. Performance improvement technology was developed to assist the industrial society to become more efficient and effective.

Gilbert (1978) strongly linked competence and performance, which appears from the title of his influential book called ‘Human Competence: Engineering Worthy Performance’. During this time, the belief that performance could be ‘engineered’, or that societies and organizations could be made, was still prevalent. Systems theory became popular: Von Bertalanffy (1969) had developed systems thinking originating from biology, but which was applied in a wide range of disciplines, including psychology, sociology and education.

Gilbert (1978) proposed three theorems, which he calls ‘Leisurely Theorems’; he uses ‘leisure’ as ‘...a synonym for human capital, which is the product of time and opportunity’ (op cit., p. 15). His first theorem is that performance is the effect of behaviour leading to consequences. But that not all consequences of behaviour are

valuable or socially acceptable. So he moves on to defining performance as the effect of behaviour leading to accomplishment, this being a consequence of desirable value. However, accomplishments are being reached by behaviour that can be too excessive and too costly, which would imply that the performance is not worthy: the costs would be too high, and the accomplishments too expensive. Therefore, Gilbert introduces the worth ratio: worth equals value divided by costs. He then links this to competence: 'Roughly speaking, *competent* people are those who can create valuable results without using excessively costly behaviour' (op cit., p. 17). This line of reasoning results in his first leisurely theorem: 'Human competence is a function of worthy performance (W), which is a function of the ratio of valuable accomplishments (A) to costly behaviour (B)' (op cit., p. 18). This first theorem and its explanation show that competence is the capability to realise worthy performance. This means that Gilbert distinguishes competence as a capability, behaviour and valuable results of that behaviour, of in his words, he distinguishes behaviour and accomplishment (which as a certain value).

It is also interesting to note that introducing his second theorem Gilbert states that '...performance alone is not competence. Competence is a social concept, a comparative judgement about the worth of performance' (op cit., p. 29). He speaks about a social standard for being able to measure competence. The second theorem is about the potential for improving performance, or the PIP. It is defined as '...the ratio of exemplary performance to typical performance' (op cit., p. 30). Exemplary performance is the best performance of a certain activity over time, in other words a historical record. It is noteworthy to see that Gilbert states that it is only meaningful to calculate PIPs for specific or identifiable accomplishments, as '...there is no "general quality of competence"' (ibid.). Elsewhere he also speaks about the context in which worthy performance gets meaning. Examples of values of PIPs Gilbert gives are 1.5 or less for professional athletes, 3 for management professionals, and 10 or more for sales professionals. He also gives examples of PIPs he found for reading teachers (10) and 'teaching certain mathematics topics' (30) (op cit., p. 43). Gilbert contends that PIPs have the advantage of showing potential or opportunity, and are thus much more positive than IQ measures which can have a stigmatizing effect. 'Poor performers usually have great potential' (op cit., p. 31).

The third leisurely theorem Gilbert presents, is seen by him as the 'management theorem', which is about selection of professionals, arranging their working environment, specifying standards of performance, performance monitoring, rewarding and problem analysis. The point Gilbert makes is that for establishing accomplishments, professionals need a certain behavioural repertory (P) and an environment (E) that enables worthy performance; examples are production tools and support systems, but appropriate reward schemes are also needed. Employers need to pay for both: the repertory and the environment, so the costs of behaviour are the sum of P and E. From this follows that worthy performance, that was defined as the ratio of (value of) accomplishment and (costs of) behaviour can be refined as the ratio of accomplishment and the sum of the cost of the repertory (the remuneration of the professional) and the environment, or $W = A/(P + E)$. Management also incurs costs, so the formula should read as $W = A/(P + E + M)$ (op cit., p. 139). Gilbert notes that

performance problems can be the result of limited competence of a professional, insufficient support systems, limited rewarding, poor motivation or other personal problems like disease. But, overall, Gilbert attributes performance problems to management problems: 'For any given accomplishment, a deficiency in performance always has as its immediate cause a deficiency in behaviour repertoire (*P*), or in the environment that supports the repertoire (*E*), or in both. But its ultimate cause will be found in a deficiency of the management system (*M*)' (op cit., p. 76). He shows that information, instrumentation and motivation both in the repertoire of professionals (*P*) and their environment (*E*) serve as essential components of and conditions for effective behaviour. The sequence of analysing performance problems is first to look at the information, responses and motivation in the environmental support (i.e. is the information given sufficient, are the instruments to enable performance available, are there sufficient incentives provided), and then at the factors in the professional repertoire (i.e. does the professional have sufficient knowledge, is there sufficient capacity to respond to challenges in the workplace and is the motivation to perform present?) (op. cit., p. 92).

So, next to competence as performance motivation and assessment object, Gilbert (1978) has emphasized the issue of competence engineering. The engineering perspective he advocates is not one that is purely technological, nor is the notion of competence, as we have seen already. By definition competence is related to worthy performance and valued accomplishments. This is also the implication of the engineering framework Gilbert uses in his work, which he distinguished from pure science. Engineers always have to take value considerations into account as to how to construct new solutions, like bridges or buildings. The process of production and construction is always constrained by social conventions, legal regulations or values. This is also visible in the model he proposes for performance analysis, which has several layers, the philosophical (i.e. about ideals), the cultural (i.e. about goals), the policy/institutional (about missions), strategic (i.e. about responsibilities), tactics/tasks (i.e. about duties) and logistics level (i.e. about schedules). At all levels, there are performance measures, such as integrity, conformity, worth, value, cost and material need, and methods, such as commitment, policy, programs, strategies, tools and supplies (op cit., p. 132).

The contribution of Gilbert (1978) to the field of professional development cannot easily be over-rated. His theorems look somewhat rigid and quasi-mathematical, but are in fact essential lessons for the practice of professional education and development. First: his notion that all individuals have a potential for performance improvement is very positive; much more positive than the notion that all persons have an intelligence score: half, or maybe even more than half, of the tested population feel bad, because of the intelligence score they received. Second: performance should not be achieved at excessive costs. This means that professionals should be competent enough to conduct certain professional tasks at acceptable costs. Third: if individuals show poor performance, attention should be paid first to the working conditions of these individuals: is there a healthy working culture, is there effective employee management, are the tasks and expectations clear, are workers allowed to use their competence to its full potential, are effective motivation and reward

schemes in place, are the tools and instruments available which are needed for effective performance? In reality, it happens too often that these factors are not taken into account, and that performance problems are tried to be 'solved' by letting workers go to professional training programs.

5.3.4 Competence and Higher Education

The concept of competence gradually made its way into higher education. Grant, Elbow, Ewens, Gamson, Kholi, Neumann, Olesen and Riesman (1979) published a series of case studies on competence-based education programs in the United States which were implemented in the 1970s. The case studies were conducted with a grant of the Fund for the Improvement of Postsecondary Education of the United States Department of Health, Education and Welfare. The same fund supported higher education institutes to redesign their curricula in the direction of competence-based education. Concerns with the *competency* movement in the USA that was spreading around at that time can be read through the lines in the Preface, where Grant is saying that the book does not touch upon the 'minimum competency testing' (in elementary and secondary schools on reading and mathematics for example where student has to pass standardized tests), 'competency-based teacher education' (which were aimed at training specific teaching skills) and 'competency-based certification' movements (op cit., p. X). Apparently, there was already significant discontent with these approaches. These concerns were amplified by Gamson (1979), who stated that 'competence-based programs have had a high mortality rate', meaning that the programs were not well-received by students and faculty at various colleges, especially those with tenure. Their natural tendency was to maintain the status quo and teach the subjects they liked according to their personal preferences.

The book of Grant et al. (1979) is aimed at describing competence-based curriculum development projects at undergraduate college level in various liberal arts and non-teaching professions. It starts with reviewing the reasons as to why American colleges were invited to convert their programs into competence-based programs. The reasons mentioned signal a sense of urgency to improve the quality of undergraduate education. Riesman (1979) points at the international competition that in certain fields scores better than the USA, for instance in the automobile industry, and at problems regarding the environment, over-population, food security, and nuclear terror, that requires higher education to prepare young people for being able to cope with this essential challenges. Grant et al. (1979) tried to define competence-based education, but were not especially satisfied with it, since the author team could list several objections against this definition. Nevertheless, the following definition was proposed in the book: 'Competence-based education tends to be a form of education that derives a curriculum from an analysis of a prospective or actual role in modern society and that attempts to certify student progress on the basis of demonstrated performance in some or all aspects of that role.'

Theoretically, such demonstrations of competence are independent of time served in formal educational settings' (op cit., p. 6).

In summary, the work of White, McClelland, Gilbert and Grant et al., have contributed significantly to the understanding of what the concept of competence means for the practice of professional learning. It shows the importance of competence in relation to performance motivation, assessment, performance improvement and education innovation. These are all essential in establishing professional and practice-based learning of good quality. To make the general observations a bit more practical, the next section considers competence in a number of professions. There have been and still are numerous examples of competence models that have served standardization in professions, certification, licensure and professional development and assessment.

5.4 Competence and Professions

As noted above, there are a number of professions for which and organizations in which competence models have been developed. A wide overview with examples is given by Rosier (1994). In the four Volumes of his handbook (binders with numerous competency models) he has included core competency models, leadership, managerial, professional, sales and marketing, finance, information systems, operations/logistics, human services competency models and competency tools and applications. Apart from professional domains there are other domains in which competence plays an important role are language and communication (Chomsky 1965, 1968; Canale and Swain 1980), mathematics (Gelman and Green 1989), intercultural communication (Hampden-Turner and Trompenaars 2000), and life (Rychen and Salganik 2001, 2003). The examples which will be given below are oriented towards professions, and are documented in the scientific literature. They have all been used in a wider context than in one organisation.

5.4.1 Management

Management was one of the first domains in which competence models were developed to assist the selection and training of professionals. Boyatzis (1982) presented a competency model consisting of various clusters: (1) the human resources management cluster (including the use of socialized power, managing group processes, accurate self-assessment and positive regard), (2) the leadership cluster (including self-confidence, conceptualization, logical thought and use of oral presentations), (3) goal and action management cluster (including efficiency orientation, diagnostic use of concepts, concern with impact and proactivity), (4) directing subordinates cluster (including use of unilateral power, developing others and spontaneity), and perceptual objectivity (op cit., p. 194). Boyatzis starts his account with the notion of

effective performance, just as White was doing in defining competence as effective interaction with the environment. He speaks about attaining specific results through specific actions which have to be consistent with organizational policies, procedures and conditions (op cit., p. 12). Effective specific actions or behaviour are at the intersection of the competencies of the individual, the demands of the job, and the environment of the organization (op cit., p. 13). Boyatzis defines competence following Klemp (1980) as ‘...an underlying characteristic of a persons which results in effective and/or superior performance in a job’ (op cit., pp. 20–21). He further describes the underlying characteristic as being a ‘motive, trait, skill, aspect of one’s self-image or social role, or a body of knowledge...’ If the work of White is interpreted well, motives, traits and aspects of one’s self-image or social role are not competencies. Motives are drivers of behaviour, and competence effectiveness is one of these. Traits are rather permanent personality characteristics, such as the big five. Self-image is the result of competence, and related to self-efficacy. Social roles are positions on the labour market to which certain activities, rights and responsibilities are attributed in social interaction, perception and agreements. Competence of professionals is part of that, because without competence the professional would not be able to play the role in question. But that is not the same as saying that the role is an underlying characteristic of competence. It is rather the other way around. Competencies are performance requirements without which professionals would not be able to effectively function in their professional situations. Knowledge, skills and attitudes are components of competence. We will come back to that.

Boyatzis used a five-step method to arrive at the competency model (op cit., p. 42): (1) Identification of the criterion measure (this is about choosing an appropriate measure of job performance and data collection, resulting in job performance data of managers); (2) Job element analysis (this is about identifying characteristics in clusters which lead to effective or superior performance as perceived by managers); (3) Behavioural event interviews (this is about interviewing, coding interviews for characteristics, relating these to job performance data, and listing validated competencies); (4) Tests and measures (this is about choosing and administering tests to assess competencies and relating them to job performance data); (5) Competency model (determine causal relationships between competencies and job performance, which lead to the validated competency model). Boyatzis is stating that there are three differences between this approach and traditional task and function analyses (op cit., p. 43): during the analysis the focus is not only on the job but also on the person, the process results in a competency model and not just a laundry list of unrelated competencies, and the model is validated by performance data. A major concern in this approach is establishing a valid relationship between competence and job performance data. Boyatzis acknowledges that, in certain professions, there are no clear performance criteria. Education is a good example of that profession, although there is a strong tendency to make teaching performance more results-oriented. But one of the difficulties is that the performance of one teacher can depend on the performance of a teacher in another subject. For instance: the performance of a teacher in chemistry or physics is depending on the performance of a teacher in mathematics. The same holds for teachers in languages. The quality of language

teaching in the mother tongue is to a certain extent influencing the learning of other languages, especially regarding sentence parsing. Also: there does not seem to be a linear and unidimensional relationship between competence and performance. One can perform tasks within acceptable but different ways and yet arrive at desired performance results. This is very well visible in doing research and teaching. Faculty can do their work in various ways, comply with standards of performance and still get positive student evaluations, sufficient credits for publications and desired promotions. Bartram (2005) points at this issue when he, just like McClelland (op cit.), calls for criterion differentiation. Without sufficient specification of competence in terms of relevant professional acting, it is difficult to grasp the meaning of professional development.

Quinn et al. (1996) also produced a competency framework for managers, although they used an approach of theory synthesis. They reviewed and constructed an overview of key management models and defined eight general directions of management roles in a competing value-framework. These directions are defined by four models of management: (i), the rational goal model, (ii) the internal process model, (iii) the human relations model and (iv) the open systems model, and by two dimensions: control-flexibility and internal-external. The eight orientations are aiming at: (i) maintaining the system, (ii) consolidation/continuity, (iii) centralisation/integration, (iv) maximizing outputs, (v) competing position of system, (vi) developing human resources, (vii) decentralisation/differentiation, and (viii) expansion/change. It is interesting to note that the authors promote the creation of multi-orientation teams in organisations because this diversity creates a more solid basis for success than having representatives of one perspective only. This vision relates to the notion of collective competence, by which the composition of the team and the current distribution of competencies is reviewed before a new team member is added to the group. The team member, in many cases, should not be a duplicate of existing team members, but add competencies the team needs and which it does not have yet at the desired level.

5.4.2 Roles and Competencies of HRD Experts

The competency profile of Boyatzis has been used extensively in management assessment, selection and development. The HRD profession in the USA has been using competency profiling for self-assessment purposes. McLagan (1983, 1989) has conducted various studies in which competence models were generated. The first study resulted in an overview of competency statements, based on extensive research within the profession. It is remarkable that this study was called 'models for excellence' because excellence is not synonymous with competence, whereas the rest of the study title is about the competency study which was done. The connection between competence and excellence is located in the fact that both are points at a continuum of professional development. Dreyfus and Dreyfus (1986) pointed at the various stages of this professional development of skill acquisition as

they called it: (1) Novice; (2) Advanced beginner; (3) Competence; (4) Proficiency; (5) Expertise. Although these levels of skill acquisition are generally accepted, the phrasing of these levels is somewhat problematic, given the developments in competence and expertise theory and research. Apart from the fact that levels 1 and 2 are referring to beginning professionals and levels 3–5 are referring to levels of mastery of professional skills, the fundamental problem is that competence itself consists of various levels, as does expertise, and proficiency is a characteristic of mastery at various levels as well. In other words, professionals can have different levels of competence and professional expertise, and are thus differently proficient at these levels. Rather we suggest to use the following phases in the development of professional expertise: (1) Ignorance, referring to novices who by instructions; (2) Nascence, referring to apprentices who work under guidance; (3) Competence in the sense of doing independent work, referring to the basic level professionalism; (4) Excellence, which stands for delivering outstanding performance as by an expert or specialist; (5) Brilliance, which indicates great talent and superb performance, as delivered by stars in the organisation, the profession or society.

Coming back to the work of McLagan (1983, 1989), one could say that competence and excellence models are different things; they represent models of different mastery of knowledge, skills and attitudes in a given domain, in which competence is related to the minimum standards of achievement, and excellence is beyond that level. This difference can easily be understood when one is hit by a life-threatening disease. In such a case one would rather go to an excellent specialist than to one who is competent, although the competent physician may effectively be able to cure the disease. Trust in the ‘excellent’ physician however will be greater and chances are that unforeseen complications will be handled in a better way than by the ‘competent’ colleague who may have less experience with potential complications.

The empirical part of the second study of McLagan (1989) comprised of a review of future forces for the role of HRD professionals, outputs of HRD professionals (products and services), the definition of standards of outputs, the level of expertise of competencies and the formulation of ethical issues which the HRD professionals may encounter.

Since the studies of McLagan (1983, 1989) the American Society of Training and Development has commissioned further studies to make a competency model for the profession, called ‘The ASTD Competency Model. Training & Development Redefined to Create Competitive Advantage’ (ASTD 2013). The model distinguishes foundational competencies (i.e. those that are relevant for success in most occupations, being business skills, global mind-set, industry knowledge, interpersonal skills, personal skills, technology literacy) and training & development areas of expertise, for which is specified what professionals need to be able to do. The areas of expertise are performance improvement, instructional design, training delivery, learning technologies, evaluating learning impact, managing learning programs, integrated talent management, coaching, knowledge management and change management. These fields resemble the HRD-roles (Biddle 1986) defined in 1989, which were: (1) Administrator; (2) Evaluator; (3) HRD manager; (4) HRD materials developer; (5) Individual career development advisor; (6) Instructor or facilitator;

(7) Marketer; (8) Needs analyst; (9) Organization change agent; (10) Program designer; (11) Researcher. They are also related to the roles, (e.g. the learning strategist, the business partner, the project manager and the professional specialist) areas of expertise (e.g. career planning and talent management, coaching, delivering training, designing learning, facilitating organizational change, improving human performance, managing the learning function, managing organizational knowledge, and measuring and evaluating) and foundational competencies are Interpersonal, Business and Management and personal competencies as identified in 2011.

In sum, an interesting difference between the models of Boyatzis and those of the ASTD is that the one of Boyatzis employed assessment and also have been used as foundation of assessment of management candidates and management education and training curriculum design. However, whereas the model of the ASTD was developed for self-assessment and self-development of workplace learning and performance improvement professionals. In general, different professional groups use competence profiles for different reasons; there is a tendency that professions in which errors cause injuries to people, damage to the environment or significant capital losses (such as in operating complex capital-intensive technical systems) use competence profiles for education and training, professional licensure and mandatory retraining.

5.4.3 The Medical Profession

Another current example of a more tight use of a competency model is the CanMEDS 2005 Framework which is used by the medical profession (Frank, Jabbour et al. 2005). This model is developed for medical experts. The roles of expert are defined and elaborated in this Framework, which consists of key competencies and enabling competencies. Medical expertise is the central quality of the physician in the framework. Apart from this role of medical expert, the other roles are communicator, collaborator, manager, health advocate, scholar, and professional.

Key competencies of the medical expert role are amongst others: ‘function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centred medical care’ and ‘establish and maintain clinical knowledge, skills and attitudes appropriate to their practice’ (op cit., p. 1). The key competencies are elaborated systematically into enabling competencies. Examples of enabling competencies for the first key competency are for instance: ‘effectively perform a consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another health professional’, ‘demonstrate effective use of all CanMEDS competencies relevant to their practice’, and ‘identify and appropriately respond to relevant ethical issues arising in patient care’ (op cit., p. 1). Examples of key competencies of the role of communicator are ‘develop rapport, trust and ethical therapeutic relationships with patients and families’, ‘accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues and other professionals’,

and ‘accurately convey relevant information and explanations to patients and families, colleagues and other professionals’ (op cit., p. 3). Examples of the first key competence in this role are ‘recognize that being a good communicator is a core clinical skill for physicians, and that effective physician-patient communication can foster patient satisfaction, adherence and improved clinical outcomes’, ‘establish positive therapeutic relationships with patients and their families that are characterized by understanding, trust, respect, honesty and empathy’, and ‘respect patient confidentiality, privacy and autonomy’ (op cit., p. 4).

Key competencies of the role of scholar are for instance: ‘maintain and enhance professional activities through on-going learning’, ‘critically evaluate information and its sources, and apply this appropriately to practice decisions’, and ‘facilitate the learning of patients, families, students, residents, other health professionals, the public, and others, as appropriate’ (op cit., p. 9). This rather elaborate description of the CanMeds 2005 Competency Framework is given (although the whole Framework is over ten full pages) to explain that this competency model is mainly content- or task-driven. This is visible in the wording of the key and enabling competencies of the core role of the medical expert, but also in the other roles, key competencies and enabling competencies. It is all about being able to provide optimal medical care. Some of the key competencies and enabling competencies read as tasks, which the physicians need to be able to do; this is also the format of the competency statements: ‘Physicians are able to ...’. Examples of this competency are establish and maintain clinical knowledge, effectively perform a consultation, accurately elicit and synthesize relevant information, respect patient confidentiality, privacy and autonomy, critically evaluate information and its sources, and facilitate the learning of patients, families and students.

Models or frameworks like those of the management, human resource development and the medical profession certainly help in mapping the domain of professions, and thus developing curricula for professional education and training and development programs for continuing professional development. How much specificity is needed is a question that is difficult to answer. Certainly, overspecialisation should be avoided, but sufficient description is needed to define course and instructional development. The core professional tasks graduates and more experienced professionals are confronted with should be at least included in the education and development programmes. This means that in specifying competence statements for professional learning, ample attention should be paid to the content-matter of the professional tasks.

5.4.4 The Purchasing Profession

An example in which we experienced the necessity of sufficient specification of content-related competence profiles is from the purchasing professions (Mulder et al. 2005). This project also resulted in a predominantly task-driven

competence framework. In this study a variety of research and development strategies were used within an association of purchasing professionals (N of population=3,083; N of pre-survey=806; N of main survey is 261; a test for sector-bias of the main survey given the population distribution was satisfactory). These activities that were conducted are (op cit., pp. 188–189): (1) qualitative multi-perspective iterative interviews for trend analysis in the literature, research and practice about purchasing; (2) stratification discussions regarding the structure of the profession in term of main roles, and group interviews for generating and structuring task and competencies lists; (3) a large-scale task performance survey; (4) a test of sector-specificity of job profiles; (5) job profile mapping; (6) job picture development; (7) competence mapping. The outcomes of the project were an overview of the major trends in the profession, regarding strategic importance of the purchasing function, the importance of internal marketing of the purchasing function, the further development of e-business, the focus on core competencies of the organizations, the emerging necessity of working in multi-disciplinary teams, the urgency of chain management, further globalization of trade, the creation of purchasing alliances, differentiation and specialization within the purchasing function, and the increasing attention for ethics and corporate social responsibility. Four job and competence profiles were developed, for four key competencies: (i) purchasing management, (ii) information and communication, (iii) initial purchasing and (iv) operational purchasing respectively. In total, 105 tasks were formulated which were generated in the different interviews and included in the large-scale survey. Job profiles were composed which consisted of the four roles and task specifications by task domains and activities. An aggregate job profile was constructed for the four roles as well and the four general tasks and thirteen subtasks. A Subtasks in the field of initial purchasing was ‘specifying the purchasing need’, and examples of tasks in that field were ‘Supporting and advising the development of functional and technical specifications of purchasing needs with the internal customer’, ‘verifying whether what has to be purchased measures up to functional and technical specification of the organization’, and ‘evaluation the completeness of the specifications’.

As will be clear, there is a strong relationship between this example and the example of the medical profession. In both examples, roles and tasks are specified and these are used as input for stating that the professional should be able to perform these tasks.

All professional competence models described above have contributed significantly to the professional and practice-based learning in the respective fields. They also all include an overview of the tasks professionals need to be able to perform in their professional field. These tasks may be closed and open, and of reproductive and productive nature. For instance, in the field of innovation professionals may be asked to cope with situations, products and processes, but they also may be expected to contribute to the creation of innovations.

Now after these task- or content-oriented competence frameworks attention will be paid to an approach that emphasises generic competencies which are stated in terms of behaviour.

5.4.5 *A Generic Behavioural Competency Framework*

Above we have raised an important question regarding the specificity of competence models for various professions. This specificity is necessary for the development of relevant and current curricula and professional development programs. But there is also a line of research in which it is tried to explain human behaviour and predict job performance and career success just as White tried to explain motivation and human behaviour. The work of Barrick and Mount (1991) is a clear example of this kind of explanation. They proposed the following five dimensions with which they tried to explain all professional behaviour: (1) openness (inventive/curious versus consistent/cautious); (2) conscientiousness (efficient/organized versus easy-going/careless); (3) extraversion (outgoing/energetic versus solitary/reserved); (4) agreeableness (friendly/compassionate vs. cold/unkind); (5) neuroticism (sensitive/nervous vs. secure/confident). Secondly, they were also very interested in testing the intelligence of candidates, again, to predict their later job performance.

A comparable approach is followed by Bartram (2005). As with the work of Boyatzis (1982), the work of Bartram is from the consultancy world. Bartram conducted a meta-analysis of 29 studies with a total n of 4,861 cases; an impressive number. The studies employed the so-called Great Eight competency factors published earlier (Kurz and Bartram 2002). The Great Eight competencies are: (1) Leading and deciding; (2) Supporting and cooperating; (3) Interacting and presenting; (4) Analysing and interpreting; (5) Creating and conceptualizing; (6) Organizing and executing; (7) Adapting and coping; (8) Enterprising and Performing (Bartram 2005, p. 1187). These competencies are further defined, and the 20 competency dimension as well as the 112 competency components are listed in the appendix with the article. Also, the hypothesized relationships between the competencies and Big Five factors are listed. The purpose of the study is to determine the relationship between competence and job performance. The author states that this relationship has been difficult to prove, because in many studies, job performance was only rated by one item (one score on overall job performance). Therefore, he calls for criterion differentiation: 'The key point of all this work is the demonstration that differentiating the criterion, in only in two broad areas, provides a considerable gain in the clarity of how personality-based predictors relate to performance' (op cit., p. 1187).

The approach presented in the study of Bartram is typical for the quest to try to explain variation in performance by a set of predictors that is a limited as possible. While this is understandable from the perspective of assessment, selection and generic advice on competence development, it is not sufficient for more detailed content-oriented professional development. Whereas the Great Eight competencies and the more detailed competency dimension and competency components are absolutely essential for the management profession, but content-driven professions like medical experts, engineers, scientists, lawyers, but also accountants, operators, nurses, teachers, technicians, logistic professionals and construction workers need a solid basis in competence in terms of knowledge, skills and attitudes that are strongly related to their work environment, and, thus, more content-specific.

So regarding the contribution of the generic behaviour-oriented models of competence, we conclude that these are of limited value for professional and practice-based learning, unless they are further specified for a certain profession and professional contexts.

5.5 Three Fundamental Approaches of Competence and Professional Development

In the preceding sections, an overview of developments is advanced in the use of the competence approach in professional and activity-based learning. As indicated, since the 1950s the concept of competence entered the professional literature. Main developments in the conceptualisation of competence since then have been described. The interim conclusion was that competence models have significantly contributed to the mapping of professions, and to the design and implementation of professional education and development programmes.

The total body of the competence literature however is much richer. For other accounts of the developments in the field of competence theory and research see Rothwell and Lindholm (1999) and Hodge (2007). Rothwell and Lindholm reviewed the competence identification, modelling and assessment literature until the late 1990s, focusing on the literature in the USA; Hodge (2007) reviewed the origins of competency-based training as the theory of vocational education that formed the foundation of the national qualification framework in Australia. Rothwell and Lindholm (1999) reviewed a number of the same authors whose most important competence works have been explained above. They elaborate competency identification, modelling and assessment practices at operational level in greater detail than has been done in this chapter. Hodge's review is limited to the origins of competency-based training, and does not go back as far as this chapter does in exploring the psychological roots of the concept. He refers to Houston (1974), Norton et al. (1978), Tuxworth (1989), and Harris et al. (1995) as sources who describe the origins of the competency-based training approach.

Advocates of the concept (Zemke 1982; Dubois 1993; Spencer and Spencer 1993) have stressed the added value of the concept of competence. However, critics have pointed at its negative properties like conceptual confusion (Westera 2001), standardization of education (Hyland 2006) and lack of measurability. Although it is true that the many attempts of applying competence in professional development (such as in competence-based teacher education) failed, there is no doubt about the importance of professionals being competent in their jobs. Rather, ways of using competence or operationalizing it in practice has raised many questions. However, the right comments on the concept have to be pointed in the right direction. That competence is being used in the debates on enhanced cooperation in education, the creation of one education space, facilitating mobility of students, the Bologna process of higher education, and the enacting of the European Qualification Framework (EQF) within the European Union does not mean students would not need to be educated

to become competent and that professionals would not be needing further professional development. On the contrary, the complexity of the demands for occupational performance in contemporary workplaces is so high that all means must be employed to warrant competence development. And, by denying the added value of the concept of competence in educational planning and professional development, and subsequently including it in a model for competences as sub skills (Westera, op cit., p. 86) only adds to the confusion, and leads to limited operationalization and use in practice. As to the lack of measurability, there is a host of recent literature that addresses competence measurement and assessment (Hartig et al. 2008; Shavelson 2010; Winther 2010; Blömeke et al. 2013).

Although critics have a point in saying that the concept of competence lacks clarity, it cannot be denied that the concept has a long and strong history (Mulder 2007), and that it has achieved a solid position in common language, professional practices and institutional regulations (Mulder 2012), such as in the European Qualification Framework and the competences of the European institutions.

Various authors have proposed different epistemological approaches to conceptualize and study competence. As mentioned already, there is the big difference between task and behaviour orientation, the comprehensive approach, stressing the importance of combining knowledge, skills and attitudes in competence statements (Wesselink 2010), and the interpretative-relationship approach, which is close to naturalistic phenomenology (Velde 1999; Sandberg 2000). The latter approach means that competence only gets meaning in the ‘dynamic conception’ of work and individual’s relationships to it. To capture competence and stimulate professional development, it is important to fully understand the meaning of competence of individuals, which can be achieved by this approach.

As an attempt to create some structure in the enormous amount of publications in the field of competence theory and research, and thus be better able to evaluate the use of competence models for professional and activity-based learning, a trichotomy in approaches of the concept of competence is proposed. The three approaches are: (1) Competence and behaviouristic functionalism; (2) Competence as integrated occupationalism; (3) Competence as situated professionalism (Mulder 2011).

5.5.1 Competence and Behaviouristic Functionalism

Initiatives like competence-based teacher education (CBTE) in the 1970s were heavily influenced by behaviouristic psychology and education philosophies which entailed the preparation of students for certain functions. The basic idea of this approach of education and professional development was to specifically determine the discrepancies between mastery of actual and desired specific competencies, which often resulted in training sometimes miniscule skills; an important pitfall of this approach was over-specification and fragmentation of learning. This approach was heavily criticised by proponents of the humanistic-based teacher education movement, and those who were convinced of the fact that reflection on action is more important than practicing endless small skills. Researchers showed that experience

and personal epistemologies had a stronger influence on professional behaviour than the training of isolated skills. Because of these insights, CBTE and with that many competence-based education initiatives fell out of favour. Nonetheless, via corporate strategy literature and practice as well as human resource management theories and instruments, the competence-based education movement became popular again, but then especially based on the second approach.

5.5.2 Competence as Integrated Occupationalism

Instead of focusing on functions, or narrow job profiles, the approach to stimulate integrated occupationalism was based on notions of holistic, generic and integrated sets of knowledge, skills and attitudes, which are needed in occupational roles and situations. Not only the task content is important, also the way in which tasks are being carried out. For instance, dentists who have to fill holes in teeth of children, reassures the child and performs the necessary actions with care. Current vocational education policy is aimed at implementing competence-based education practices in which it is stressed that knowledge, skills and attitudes should be integrated in the curriculum, teaching, learning and testing. In present qualification frameworks and competence-based education models it can be seen that attempts have been made to link core roles and work situations, work-processes, and competencies. Within the European Union, this process is being stimulated by the development of national qualification frameworks in relation to the European Qualification Framework (Mulder 2012). The approach is called occupationalistic as a lot of weight is attributed to the demand side of education, as part of the neo-liberal theory of market-led economies. The needs in the labour market are considered to be leading in the articulation and definition of the functional specifications of education. So, in many countries, industry defines the needs for education. However, not only do industries find this task difficult, this approach is also fundamentally limited. The problem can easily be understood because not all companies and institutions, large or small, and in different economic sectors, are working with optimal organizational models, nor are they all sufficiently innovating or transforming their business models which is needed given developments in technology, markets and society. So educational institutes themselves have an autonomous role in formulating their educational philosophy on preparing young generations for the future. Balance is needed in the influence of various stakeholders in educational planning and professional development.

5.5.3 Competence as Situated Professionalism

This approach is based on the observation that competence only has meaning in a certain context, in which professionals interact with each other. For instance, when a competence domain of communication is at stake, it means something totally

different for a secretary giving standard information to students than for researchers who are defending a thesis. Also, communication for researchers means two very different things when they are interviewing a respondent or having a job interview. The professional context, on the other, had also enables competence development because of its affordances (Gibson 1979). He conceived of affordance as characteristics of a given context which provide possibilities for professional action and development. Affordances can be perceived and acted upon, given the abilities of agent. These abilities, defined as effectivities by Shaw et al. (1982) who saw these as functions of a being in relation to its context, or formulated a bit wider, as the abilities of an agent. These affordances and effectivities have a lot in common with competence development in context, although the work of Shaw et al. (1982) has a more perceptual base.

Competence also develops during experience with certain activities and in varied situations. This approach of situated professionalism is related to notions of situated cognition: 'Knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used' (Brown et al. 1989, p. 32). In situated professionalism, the development of a professional identity is also important, which is an idea that is related to the theory of situated cognition. While growing in the role of beginning manager, consecutive experiences of successful performance, positive feedback on successes, and the feeling of learning of and with colleagues, results in a positive self-image of the individual. The work context then takes shape as a community of practice in which players interact and share and negotiate meaning (Lave and Wenger 1991; Wenger 1998; Wenger et al. 2002). It is also closely related to theories and practices of professional development which show that personal epistemologies (Hofer and Pintrich 2002) have a stronger influence on professional behaviour than isolated skills training. It also touches upon the notion that competence is heavily influenced by what important stakeholders expect of the professional in terms of wishful professional action. Professional associations (such as associations of medical specialists or pilots), but also local players (such as hospital directors, chefs de Clinique, and airline executives) have a strong influence on the desired competence fields and the extent to which the professionals need to be proficient in these fields.

The theory of situated cognition (and thereby situated professionalism) has not remained without criticism. Anderson et al. (1996) state that not all learning is necessarily depending on a real context, transfer is possible if tasks are similar, learning of abstractions is possible by giving concrete examples, and not all learning needs to be individual. Nevertheless, social-constructivism learning theory has been quite influential in professional education and development, and as a consequence authentic learning and competence-assessment have become widely distributed in professional learning arrangements. An important pitfall here is holism, when details of competence are covered under generic expressions of abilities of people, which may be sufficient in personal development processes, but not for professional certification purposes.

Evaluating these approaches against their potential use for professional and activity-based learning, it can be said that it is difficult to say which one is most effective.

That mainly depends on the situation and the specific task for and in which a professional has to develop. Training specific behaviour can be very effective in sports and music, but also in medical education. On the other hand, education for certain occupations can be very effective in vocational school settings. Finally, professional development of teachers can be very effective in an in-service-situation. In short, there is added value in all three approaches, and the interim conclusion here is that competence-based initiatives contribute to the quality of professional and activity-based learning. It appears that learning needs (whatever closed or open they are) are being specified, which guide the direction of professional development programmes and activities.

5.6 Conclusions, Discussion and Further Research

The main question in this chapter was whether conceptions of professional competence have helped the practice of professional and practice-based learning. The interim answers on this question throughout the chapter have been positive, and the general balance regarding this question is also positive. Indeed, we think that the development of competence models (frameworks or profiles) help in mapping professions. We also think this should not be done in a rigid way. The reality of professional practice is dynamic, but on the other hand quality requirements in certain professional domains require a certain level of standardization, especially in hazardous occupations and professional domains which have an important influence on health, safety and risks. Approaches of competence development such as those described (in the training, education and development context) have to be made context-specific as their added value is situation-specific. Important variables to take into account are the level of the profession, the field of practice, the intentionality of learning, and the formalisation of learning activities. Professional and activity-based learning practices vary considerably by these variables.

As has become clear in this chapter, many conceptual studies appeared regarding the concept of competence, competency, competencies, competence models, competence systems, competence dictionaries, competence-based management, competency-based education, competence testing, competence assessment, competence centres, etc. The number of empirical studies has been increasing however.

Mulder (2004) established a series of principles of good-quality competence-based education, which was adapted by Wesselink (2010) who constructed a matrix for competence-based vocational education, which consists of eight principles of education and four levels of implementation. Experiences of teachers with the matrix were studied (Wesselink et al. 2010). This model for curriculum design practice was further elaborated and now consists of ten principles of education and five levels of implementation. The model is validated in senior-secondary vocational education, and proven to be useful in assessing and developing competence-based vocational education programs (Sturing et al. 2011). As such, this instrument contributes to the quality of professional and activity-based learning.

Furthermore, Mulder (2006) studied the inclusion of sectoral social partners in European competence development projects, and concluded that this leaves a lot to be desired. Biemans et al. (2009) studied measures to overcome the most common pitfalls of competence-based vocational education and reported on the effects of these measures. There are also advancements regarding authentic student assessment (Gulikers et al. 2010). Gulikers et al. (2009) described evaluations of the quality of competence-based assessments as perceived by curriculum developers, teachers, students and employers. Experiences of education developers, teaching staff and students regarding competence-oriented learning environments have been studied to evaluate the different perceptions of these stakeholders regarding the intentions and practices of this educational innovation (Wesselink et al. 2010). Furthermore competence studies were conducted in various professional domains which were not yet mentioned in this chapter: agricultural extension to develop a competence profile for agricultural instructors (Karbasioun et al. 2007); rural consultancy in the field of HIV/Aids in Africa, in which key competencies for the socially sensitive issue of extension on reproductive practice and the dangers of infection were identified in a participatory way (Brinkman et al. 2007); environmental education for which competencies were identified (Wesselink and Wals 2011); entrepreneurship in greenhouse horticulture (Mulder et al. 2007a; Lans 2009; Lans et al. 2008, 2010a, b; Lans and Gulikers 2010); teacher competence on inquiry-based science teaching (Alake-Tuenter et al. 2012); corporate social responsibility, a field that is just being explored (Osagie et al. 2012).

There is also advancement in the field of competence development and knowledge arrangements. New arrangements for cooperative knowledge creation have been explored (Beers et al. 2010), as well as regional learning arrangements, and competencies for the establishment of regional learning (Oonk et al. 2011), to see whether process-based reflection in multi-stakeholder groups can help overcome the barriers that existed in the older models of knowledge dissemination. Furthermore, there is progress on the acquisition and fostering of interdisciplinary, intercultural and argumentative competence. Many of the problems students and professionals in the natural, life and social sciences encounter in their field of work are related to these issues. Since professionals need to be able to justify their choices and practices in a more and more digitalised working environment, it is also interesting to look at research on learning in advanced digital collaborative learning spaces. Studies were conducted in the domain of interdisciplinarity (Spelt et al. 2009), intercultural learning (Popov et al. 2012) and argumentation-based learning in online collaboration spaces (Noroozi et al. 2011, 2012, 2013a, b).

The relationship between competence and professional performance has not yet been studied intensively. There has been research by Lans (2009) in small and medium sized companies and Du Chatenier (2009) in open innovation teams in large organizations. However, since establishing worthy performance is costly, and performance outcomes (accomplishments) should justify the costs of performance, it seems to be worthwhile to further investigate the effects of competence development on professional performance improvement.

Various competence studies have been based on large surveys on opinions and perceptions of competence as needed in professional practice. Some experiments have been done to study specific aspects of competence development. However, more ecological validity is needed in this type of research. Professionals in given contexts performing certain tasks and exerting certain responsibilities need to be studied to see what is actually going on at the intersection of working and learning. In other words: competence development in workplace learning settings should further be explored. It would also be worthwhile to further study the effects of different competence development strategies in specific domains.

As a final caveat, this chapter is concluded with a general pitfall in competence-management and development practices. Competence-based professional development often starts with modelling professional competence. The development of competence frameworks for professions is informed by empirical research, but in the final stage it is an act of normative decision making. These frameworks are being used as standards within certain professions or organisations with which professionals have to comply, either for registration or for re-registration. Once models for professional competence have been developed and professionals assessed, learning needs can be aligned to these models. This does not automatically happen, since learning processes are taking place anyway, intentional or incidental, organized or informal, conscious or unconscious. The default mechanism for professional development plans is to revert to training. However, in many cases training is not effective for professional learning and other development activities have more potential. Transforming a workplace in a smart collaborative learning place, or creating scripted online knowledge sharing networks with embedded tutoring, may be much more effective. In general, competence development is a socio-constructivist learning process in which social interaction and situation-specific searching for quality improvement of working processes is of utmost importance.

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Chapter 6

Becoming a Practitioner: Professional Learning as a Social Practice

Silvia Gherardi and Manuela Perrotta

Abstract A practice-based interpretative framework for reading the process of becoming a professional as a social practice is developed to examine the ecology of the human and non-human actors involved in induction to the organization and seduction by the profession. We argue that professionals undergo induction into the organization while they undergo seduction by the profession. The chapter illustrates the situatedness of this process in relation to different types of organizations (private, public, network) in order to analyse the relation between the induction process and the actors that influence it. Three different models of induction are described: (a) in a professional bureaucracy, socialization precedes selection, and the key actor is the profession; (b) in a small private organization, induction is almost exclusively managed by the community of practice in the form of seduction by the profession; (c) in a large network of organizations, induction is explicitly managed by the organization and becomes a means to transmit the organizational culture.

Because the process of becoming a professional is a continuous process throughout working life, the tensions and contradictions that characterize its accomplishment are discussed in relation to the issues of behaviour control versus professional control, managerialism versus professionalism and identity work.

This chapter proposes that induction is not solely the effect of encounters between individuals and organizations, because two other agents are involved in the process: the profession and the community of practice.

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6.1 Introduction

The process of becoming a professional is usually described as a socialization process whereby novices learn how to perform a series of occupational tasks and how to develop appropriate identities as practitioners. Usually, sociology of work and sociology of occupation use the term ‘socialization’ to describe the reciprocal accommodation between an organization and an individual during the life-time of a presumably long-term work relation. Typically, it is the point of view of the individual that is privileged in this analysis, and from this point of view the socialization process resembles a trajectory or a stage model starting with anticipatory socialization. This occurs during the educational process: upon entry into an organization the individual assumes the social position of the novice; then later becomes an insider; and finally gets ready to leave the condition of employee through a process of gradual disinvestment from the working context. More recently, and especially within organization studies, it seems as if the scientific community is seeking to renew its lexicon so that it can continue to reflect on the same phenomenon but with new concepts. The term ‘induction’ seems to have arisen from this dynamic and the organizational point of view, and it is assumed as the main agent of the process.

The strength of the new term ‘induction’ lies in the semantic openness deriving from its scant definition. Whilst studies on socialization (e.g. Van Maanen 1976) have moved through the development of diverse conceptual models and methodologies of analysis including those from socialization as an independent variable affecting numerous organizational factors, through to models privileging the organization/individual relation viewed as a problem-solving process, to a model where socialization is an ongoing process and not an individual trajectory, induction is a notion still to be fully modelled and elaborated. For the initial purposes of this chapter, we adopt the definition of induction put forward by Skeats (1991: 16) as “any arrangement made to familiarise the new employee with the organization, safety rules, general conditions of employment, and the work of the section or department in which they are employed”. This is a minimal definition, in that ‘any arrangement’ may vary from mere information lasting as long as an interview to a training course of even very long duration. This minimal definition is based on the implicit assumption that induction consists in a series of activities deliberately and formally undertaken by the organization to integrate new employees efficiently and effectively once they have been recruited. Therefore, the main aim of the managerial literature on staff induction is to provide normative advice on how new employees can be better integrated into their new working environment (Major 2000; Ards et al. 2001; Tuttle 2002). At least four dimensions relating to the introduction of new employees have been explored in empirical research: (i) socialization tactics (Ashforth and Saks 1996; Allen 2006), (ii) newcomer adjustment (Cooper-Thomas and Anderson 2002;

Bauer et al. 2007), (iii) newcomer's commitment (Allen and Meyer 1990; Bauer and Green 1994) and (iv) identification (Pratt 2000).

A recent review of empirical research in the field of induction and socialization (Antonacopoulou and Güttel 2010) identifies three main strands. Firstly, the individual and organizational antecedents, i.e. the newcomer's predispositions and the firm's practices which govern staff induction, secondly, the inductee's adjustment and, thirdly, learning behavior over the course of their socialization; the outcomes of staff induction and socialization, especially in terms of person-organization fit. Moreover, Antonacopoulou and Güttel (2010) point out that the majority of researches undertaken are focused on the individual inductee as the main unit of analysis and thus are conducted with a dominant focus on psychological aspects.

Yet, if induction is to be understood in a specific but highly reductive sense, we fail to understand why the term is used synonymously with socialization, and why the management literature has sponsored it, thereby presenting in new guise a worn-out concept disciplinarily connoted in sociological and psychological terms. We are critical of such a narrow definition. For instance, consider the Latin etymology of the term: *in-ducere* is composed of the verb *ducere*, i.e. 'to lead' and the preposition *in*, which denotes place change. Induction thus signifies 'to lead in', i.e. to lead along the right path. The role of leadership is thus foregrounded, together with passivity and the passivization of those inducted. This linkage with the theme of leadership may explain the preference of management scholars for this term. We shall assume the term 'induction' in accordance with the etymological derivation of a process that leads along the right path, but we shall also correlate it with another term only apparently distant from it: seduction. The etymology of *se-ducere* comprises the same verb of motion, but the preposition denotes taking away, i.e. leading away from the straight and narrow path. Hence, seduction is an action that distracts the subject, who – seduced – is induced to follow the seducer away from the right way to the world of their passions. Leadership and seduction are, therefore, not distant or incompatible terms, as Calàs and Smircich (1991) have already noted adopting a deconstructionist methodology.

We shall discuss the process of induction/seduction in terms of the becoming of the relation among an organization, a profession and individual professional identities. The notion of "becoming" draws attention to movements, emergence, flux, process and organizations as "worldmaking" activities (Chia 2003; Carlsen 2006). Becoming denotes the emergence of a sociology of verbs that in organization studies began with Karl Weick's (1979) work, which introduced the terms 'organising' and 'sensemaking'. It continued with the sociology of translation (Law 1994: 103) – that is, a sociology of 'contingent ordering' that interprets society as a relational achievement and ordering effect – and then underwent the 'narrative turn' which emphasised that storytelling – i.e. the performance of stories – is a key aspect of organizational members' work lives (Boje 1991; Czarniawska 1997). The concept of becoming finally underwent what, at present, appears to be its latest turn, the 'practice turn', which has completed the change from knowledge to knowing. This transition from nouns to verbs has produced an epistemological shift to the analysis of processes, temporality, and the negotiation of meanings. Our aim is,

therefore, to elaborate a theoretical framework for the study of induction as a situated practice. The practice-based approach to induction that we propose is grounded in organization studies, and it conceives organizations as flows, as verbs in the process of always becoming (Chia 1995; Clegg et al. 2005; Gherardi 2011). Professional learning is a process of becoming that does not end with the acquisition of the status of insider, nor is it a linear process, nor is it a stable end-state.

Through brief illustration of an empirical research study, we shall show how individuals undergo induction (to the organization) when they undergo seduction (by the profession) within the power structure of a field of situated working practices. Our empirical field is the world of the health-care professions. In particular, three case studies conducted at centres for medically assisted reproduction will illustrate three ideal-typical models of becoming a professional. This empirical field will enable us simultaneously to show the action of the organization and the action of the profession in inducting/seducing newcomers. Before presenting the empirical cases, we shall describe our theoretical-methodological framework, which is situated within practice-based studies (Corradi et al. 2010). We then familiarize the reader with the dynamics of becoming a professional through a fine-grained description of the ecology of forces at play across three case studies before discussing the main sources of tensions that arise through these processes.

6.2 A Practice-Based Approach to Induction/Seduction

Returning for a moment to studies on socialization, we would point out that they connect closely with the idea that, during the socialization process, novices ‘learn’ the tricks of the trade that others ‘teach’ them (Van Maanen and Schein 1979: 211). Also, when socialization is conceived as a continuous process, we find this link, defined as the mobilization of knowledge as a result of interactivity between the newcomer and more experienced members (Danielson 2004). It is, therefore, easy to establish a connection between learning viewed in the context of studies on socialization and the context of studies on situated learning and knowing in practice (Lave and Wenger 1991; Elkjaer 2003; Gherardi 2009). The connection is made by conceiving the learning process as competent participation in work practices and as the simultaneous development and performance of a practitioner identity. Moreover, if we consider the verb form ‘to practise’, practice is seen as “undertaking or engaging fully in a [...] profession” (Brown and Duguid 2001: 203). Becoming a practitioner, therefore, involves the learning and development of competences which are professional in the strict as well as relational and identitarian sense. This process is simultaneously explicit and conscious, and implicit and unconscious. Becoming competent in the working practices of a profession entails mastering the coordinated activities that a community of professionals builds in sustaining the traditions of a profession (including tools, artefacts, discourses) and the practising that re-creates connections in action in the everyday texture of workplace knowing and learning (Gherardi 2006).

The practice of a profession consists of both canonical elements – what we can identify as formal prescriptions of tasks and jobs – and non-canonical ones (Brown and Duguid 2001: 203). While the former can be defined and abstracted within formal prescriptions and, therefore, expressly transmitted through formalized education and training, the latter are transmitted during participation in working practices and in the development of practitioner identity, and they are to a large extent implicit and also unconsciously learned and transmitted. When people become professionals, the socialization process that precedes their actual entry into an employment relation is highly important and controlled by professional associations, by ethical norms, and by the culture of the profession. For example, the socialization process in medicine has received close attention in the literature (Becker et al. 1961; Atkinson 1995; Witman et al. 2010). The way in which future doctors learn to behave according to the non-canonical norms of the profession is considered as important as their formal education. This socialization process has been called ‘the hidden curriculum’ (Hafferty and Franks 1994) through which doctors internalize norms of ethical behaviour, power relations and collegial manners. The medical habitus (with a reference to Bourdieu) is the effect of a socialization process (Luke 2003). It can be seen in the liturgy of the clinic, the meetings, the patient rounds and the medical talk (Atkinson 1995; Freidson 1970). Despite medical practice in different organizations, despite changes in health care, despite generational changes, this pre-organizational socialization to the profession remains quite stable. Becoming a practitioner within a community of practice entails, in fact, recognizing and actively participating in discussion on the professional norms that define what are typical and good professional practices (Lave and Wenger 1991). The competence of the practitioner recognized as a full participant in the professional community is, therefore, a social, technical, as well as discursive competence because the professional community recognizes competence in debating and discussing the canons of correct ethical and aesthetic practices. What is negotiated and contested within a practice, and among practitioners, is not just the effectiveness or efficiency of the practice, but the vision of the world (ethical and aesthetic) that sustains a collective mode of doing. Practitioners have an emotional, aesthetic and ethical attachment to the practices that they support and reproduce. This attachment creates affiliations and celebrates ‘community’ within the community (Gherardi 2009).

In general, these professional norms, values and vocabularies are strongly institutionalized and adopted essentially through socialization processes, mainly pre-organizational and productive of a habitus or a system of dispositions, subconscious schemes of perceptions and appreciations that point the way to practising. We may say that the literature on organizational socialization is informed by especial attention to the internalization of norms, habit, and cultural adaptation of individuals to the profession and to the organization in which they will perform. On the other hand, the literature on communities of practice complements the literature on organizational socialization because it takes a similar point of view.

The work of Lave and Wenger (1991), introduced to an organizational audience by Brown and Duguid (1991), is focused on how learning at a collective level may occur as part of the lived day-to-day organizational activities. Under the label of

'social learning theory' the ideas of learning as participation, legitimate peripheral participation, and community of practice have been explored, developed and contested. If we circumscribe the birth of the idea of community of practice to its historical-cultural context, we note how it differs, on the one hand, from cognitive theories of learning and, on the other, from the conception of learning as individual learning. Hence, by means of this concept a shift was accomplished both with respect to where learning takes place (i.e. in the community, not in the head) and in respect to who learns (i.e. the community as a collective subject, not the individual). However, on adopting a perspective in which induction is viewed as an explicit and conscious activity by the organization which temporally follows the selection process and whose purpose is to facilitate socialization, we may, therefore, wonder how to describe (i.e. assuming that it exists) an organizational practice of induction. To this end, it is necessary to make explicit the theoretical premises of theories of practice compared with those of theories of action.

While theories of action assume a linear model of explanation which privileges the intentionality of actors, from which derives meaningful action, theories of praxis (Cohen 1996) assume an ecological model in which agency is distributed among humans and non-humans and in which the relationality between the social world and materiality reconfigures agency (Latour 2005) as a capacity realized through the associations of humans and materiality. Theories of practice are inscribed within conceptions that can be called 'post-humanist' in that they seek to decentre the human subject (Knorr Cetina 1997) and focus on relationships. A focus on social practice emphasises the relational thinking based on interdependencies between subject and object, person and world, networks and society. They develop their properties only in relation to other subjects, social groups, or networks (Østerlund and Carlile 2005).

Methodologically, an interpretative framework of induction as a social practice within an organization pays attention to the ecology of humans and non-humans involved in the production of induction as a social effect. The intentionality brought into being by the organization in making arrangements and planning organizational routines for induction purposes, therefore, amalgamates with the intentionality and the emotionalism of the subjects about to become practitioners (Gherardi and Perrotta 2010). In turn, the professional communities have a certain way of conceiving and undertaking working practices establish a relationship with newcomers. The effect of this ecology of actions may be a successful or unsuccessful induction, or even a hybrid negotiation of emergent intentionality in which all the relationships at play are modified by and during the process.

To illustrate who are the agents within the ecology of practices that compete in the process of induction and how their power generates the tensions that frame the process of becoming a professional, we shall present three different scenarios that can be taken as ideal types of organizational contexts. In fact, the concept of situatedness is central within a practice-based approach to becoming a professional since we cannot avoid consideration of the contingencies of the field of practices within a specific

organization and a specific community of practices. In other words, the becoming of a professional is necessarily the effect of a texture of situated practices, and every community of practices follows a situated curriculum on admitting a new member.

The concept of ‘situated curriculum’ (Gherardi et al. 1998) denotes the pattern of learning opportunities available to newcomers in their encounter with a specific community inside a specific organization. Whilst the learning curriculum focuses on the learning opportunities related to a specific occupation, the notion of the situated curriculum emphasizes that its content is closely related to the particular set of local material, economic, symbolic, and social characteristics of the system of practices and work activities. Most of the time, the situated curriculum is not fully known to the practitioners that enact it; or it may be part of a negotiated agreement and, therefore, bears many similarities with the hidden curriculum in that it is informal and non-canonical.

The theoretical framework that we have elaborated assumes that induction is produced within an ecology of practices at the moment when the newcomer is seduced by the ecology itself. We shall, therefore, analyse induction as a social practice within this ecology produced in the interaction among organizational induction routines, the emergence of a practitioner identity, and the working practices of the community to which the aspiring practitioner seeks entry. Moreover, we must consider also the professional associations that may exert an influence within that ecology and may take part in generating and solving the tensions and contradictions that pave the way to becoming a professional.

6.3 A Methodological Note

Three different centres for medically assisted reproduction were studied empirically using qualitative data collection and analysis techniques – specifically participant observation and interviews (Perrotta 2008; Gherardi and Perrotta 2010). In accordance with the logic of theoretical sampling (Glaser and Strauss 1967) the three centres were selected because of their different organizational characteristics, with particular regard to the size of the centre and its organizational form. The centres selected were the following: Sisma, a public university centre of medium size (around 300 infertility treatments a year); Beta, a private centre of small size (around 60 treatments a year); and Bioartlife, a network connecting a large centre with six satellite centres of medium and small size (for a total of 1,500 treatments a year, of which half at the main centre).

The next sections will be devoted, not to a detailed description of ordinary activities, but to descriptions of the different textures of induction practices in the three organizations studied. We intend to use the three cases as illustrations of three ideal typical models of induction practice. We, therefore, describe the respective situated practices in order to show the dynamics of interactions and the tensions between agents.

6.4 Sisma: When Socialization Precedes Selection

Sisma is a public assisted reproduction centre. It is part of a university hospital in which the personnel work in close contact with the adjoining gynaecology department. The Assisted Reproduction Technology (henceforth ART) centre has two chief consultants in reproductive medicine (each of them in charge of a team of doctors and trainee specialists); a head of the ART laboratory; a biologist; two anaesthetists in the operating theatre (who also supervise two trainee specialists); four nurses; and two ward attendants.

During the field observation, it was very difficult to determine the positions occupied in the organization. I (MP, the second author) was able to distinguish staff from patients by virtue of their nurse's uniforms or doctor's coats, but I did not have sufficient information to decide who did what. In fact, although some white uniforms had red (for doctors) and green (for nursing staff) badges, a large number of other subjects wore white coats without any type of marker, so that it was not possible to identify the positions of these people at the centre. The markings on white coats differed for a highly symbolic organizational reason: the centre provided white coats for nursing and medical staff; while trainees at the centre had to purchase their own coats regardless of their formal position. This artefact thus performed the function of a material symbol of induction, in that possessing it with a coloured badge signified membership of the organization. By contrast, its personal purchase symbolized the time to wait before being hired.

The white-coated students, in the two teams that I observed, all seemed to have the same position, but as I followed them in their activities and talked to them, I realized that there were differences. The student specialists describe the trajectory followed by novices as a process consisting of three stages:

- Undergraduate: Undergraduates come to the centre in the fourth or fifth year of medicine because they want to write a thesis in gynaecology. Their university supervisors assign the students a thesis topic, arranged for their attendance at the centre (in terms of days per week), and allocated them to an 'expert' trainee clinician (i.e. a fourth- or fifth-year student at postgraduate medical school), who decided what the student should do in the healthcare practice. In this period, the students do not take active part in the centre's activities.
- Intern: after graduation, attendance at the centre became more regular, given that participation in its activities was decisive for those seeking admission to postgraduate medical school. As one of the interns explained: *an intern is a transitory figure hopefully about to enter postgraduate medical school*. The period of time spent at the centre as an intern varied (from a few months to 4 or 5 years) and depended on the individual case: *as 'an aspiring trainee specialist', you sit the entrance examination and wait for a grant for postgraduate medical school, and then you attend for five years*.
- Trainee clinicians: on passing the entrance examination for postgraduate medical school, the students attended the centre for 5 years and took part in its various activities (monitoring, pick-up, transfer, etc.). The trainee clinicians officially

joined the organization and had a well-defined role: they clocked on and off; attended the centre for 36 h a week, had to be on ward duty once a week, and received a bursary which paid for their work.

All three of these positions in the trajectory of becoming a member of the organization preceded the formal moment of selection, but they signalled a hierarchy of rules and competences among newcomers. It emerged from observation and interviews that tasks were assigned to new arrivals (i.e. the undergraduate medical students, the interns beginning attendance at the centre, and the trainee clinicians) according to a situated curriculum. The route followed by students wanting to enter the centre was well defined. While they were writing their theses, assiduity of attendance at the centre was relative, and they were more concerned to develop the topics of their theses. They followed a 'bottom up' training process whereby they gradually participated in the centre's work. When the student became an intern, the 'expert' trainee clinician to whom they had been assigned began giving them elementary tasks: for example making photocopies, or taking test tubes from the operating theatre to the laboratory. Through their participation, the interns began to receive slightly more demanding tasks: compiling the clinical records of patients, for example. When the interns passed the entrance examination to postgraduate medical school, they began to take active part in the centre's activities, but in this phase, too, tasks were assigned gradually. The status of the trainee clinician changed from peripheral participant to actual participant in the 5-year postgraduate medical course. Participation, it was explained to me, progressively increased: *It's gradual. At the beginning you do the [clinical] records, or not even the records because you don't know how to, you make photocopies... then as you get on, you do more professional things; it's not as if as soon as you arrive he [the professor] hands you a scalpel and says 'operate'. But yes, it's gradual, there are also things that you'll never do because they won't let you, but what he doesn't want to do because it's a drag, he lets you do.*

The three phases of the trajectory were pre-specified, but they could be of different durations. The position of undergraduate thesis-writers might last 1 or 2 years, while that of interns might vary from a few months to several years. The interns therefore followed different routes. There were a fixed number of places at postgraduate medical school. An entrance examination was held every year, and those who failed had to wait until the following year to take it again, and there was no guarantee that they would succeed on the second attempt. For this reason, there was fierce competition among the interns. Only postgraduate medical school was of fixed duration (5 years).

During my period of observation, I realized that the two 'expert' trainee specialists had a great deal of autonomy in all the centre's activities, not only the more central ones (for example, clinical work, oocyte extraction, or transfers) but also others (handling relations with medical representatives). Moreover, the 'expert' trainee specialists had the task of supervising the interns at the centre. The relationship between an intern and the supervising trainee specialist was hierarchical – as was that between the trainee practitioner and the chief consultant. The distribution of

power in the group was clearly vertical. Moreover, their relationship was negatively influenced by the competitive environment (at the end of the process only few trainee specialists would be hired by the centre) and characterized by the non-sharing of knowledge.

Summarizing the process by which novice gynaecologists were inducted into the centre, final-year students doing research for their theses cannot be considered members of the organization. On graduation, they spent varying periods of time waiting for admission to postgraduate medical school and attended the centre as 'interns'. Internship could last for even long periods of time, during which participation in the centre's activities grew increasingly intense. It is, therefore, difficult to determine exactly when the interns became full members of the organization.

Additionally, from a formal point of view, the trainee specialists were members of the organization. They clocked on and off, and they received bursaries for their work at the centre. Hence, they were effective members of the working unit, even though temporary ones (postgraduate medical school lasts for 5 years). However, although a sharp distinction between members and non-members can be made in formal terms, from the point of view of participation in the centre's activities it is less straightforward. Not all those who had completed medical school continued to attend the centre. Their decision on whether or not to do so depended on the availability of work at the centre or on contracts taken elsewhere. If they became a permanent member of staff, their change of status was largely formal. Whatever the case may be, they could not be described as newcomers.

This interpretation was confirmed when I asked the head of laboratory how newcomers were inducted. His reply was: *What newcomers? There's nobody new here. New intake has been frozen for years, and there are no new researchers. The last to arrive was, the biologist, and he's been here for years.* He did not believe that the medicine undergraduates, the interns, and the trainee specialists could be considered 'novices' in the organization.

From the medical team's point of view, undergraduates were not novices because they were not directly involved in the ART process and participated marginally in the group's activities. Their constant presence at the centre, first as undergraduates and then as interns, made their participation slow and gradual. These roles also served to enhance their novice status. Hence, when they became trainee specialists they were not regarded as novices because they had already been at the centre for years. The facets and contradictions within the category of novices were reflected in the fact that none of them was perceived as novices; rather they took part in the centre's activities as non-members.

The Sisma case shows how induction is the effect of an ecology in which organizational routines accompany a newcomer's entry are entirely lacking, because when the organization begins the selection process, the newcomer's socialization has already been accomplished. The professional community is instead the actor with complete autonomy in the management of socialization and which, informally, also manages the selection process. Finally, the community of practice, given the competitive nature of its relationships, is an ambivalent actor in a new member's

induction because it is responsible for both transmitting knowledge relative to the tasks that form the situated curriculum and implicitly selecting among the members themselves.

6.5 Beta: When the Profession Seduces

Beta is a private centre of very small size founded more than 20 years ago by Paolo, the gynaecologist who directs it, together with a group of friends and colleagues. These include: Alex, another gynecologist (who no longer works at the centre), Marco, a biologist, and Sara, an anesthetist. In recent years, Alex's place has been taken by Valeria, a young assistant gynecologist who worked with Paolo when she was specializing at university. The final member of the centre's medical staff is Ciro, a recent graduate in medicine waiting to enter a specialization school and Paolo's nephew.

The centre is located on the first floor of a private clinic, from which Paolo leases the premises (i.e. rooms for patients, laboratory, operating theatre, and so on), the personnel (i.e. nursing and administrative staff), and equipment for the laboratory and the operating theatre. All activities relative to the treatment (i.e. oocyte pick up, laboratory operations, sperm self-donation) take place within the centre, while during the initial phase (i.e. first examinations and monitoring) and the phase subsequent to the embryo transfer, patients are treated by Paolo at his private surgery.

Given the limited number of patients and treatments, to minimize costs, work at the centre is organized in "cycles": Paolo groups a certain number of patients (at least ten) and organizes all the interventions in periods of time ranging from a week to 10 days, with intervals of a couple of months between one cycle and the next. As the centre is so small and has developed on the basis of trust relations among the four friends/colleagues, it has no formalized practice of selection and induction; rather, these are the outcomes of an implicit process. This case study is significant because it epitomizes situations which are 'minor' from an organizational point of view but very common numerically and representative of the type of organizations which arise on the basis of trust relations among their members. One does not become a member of such organizations through formal selection, nor because of selection by the professional community, but by participating in a community of practice that is entered on the basis of the (relational and reputational) social capital (Coleman 1988) possessed by newcomers.

For the two most recent newcomers at the centre, Valeria and Ciro, in fact, access was made possible by personal relations which drew on social capital. Valeria, had met Paolo while she was at specialization school and he was working at the university where she was specializing. Their collaboration began externally to the centre and then stabilized and developed within it, when Alex, the second gynecologist, decided to leave the centre and a post fell vacant. Valeria was, therefore, not a novice in the profession when she joined the centre.

The only novice at the Beta centre was *Ciro*, who had been only sporadically present since he began working on his thesis 3 years previously. *Ciro's* position was distinctive, because he was present in the operating theatre as an intern, so that he actively participated in the practice. As *Ciro* specified: "*I am not an assistant. I collaborate with the operating theatre's work*". This specification is important because it highlights *Ciro's* position as a novice with respect to the centre and to the profession. *Ciro*, in fact, was supervised in his learning process through constant explanations of activities and instructions on how to do the work. During the period of observation, *Paolo* – while working in the operating theatre – frequently directed *Ciro's* attention to the monitor on which uterus and endometrium could be seen, showing him their normal shapes and giving advice on how to recognize them.

Learning how to see images on the ecograph monitor, in fact, is one of the practices most difficult to acquire in both reproductive medicine and medicine in general. According to *Ciro*, he had difficulties in recognizing images on the ecograph screen because he only sporadically engaged in the activity: gaining experience in this field meant "getting an eye for it", developing visual skills.

A very similar account was also provided by *Marco* in relation to his experience of learning laboratory practices: "*There are no schools, books or handbooks; these things you only learn with practice. I spent a year and a half watching what they did; but if they don't make you do it, you don't learn*". *Marco* then explained to me that at the beginning of his career he had gone to a centre in London to learn the techniques. However, the manager of the centre had commercial relations with an ART centre in the south of Italy and situated in the same city from where *Marco* came. For this reason, the manager was afraid that, once *Marco* had learned the techniques and returned to Italy, he would open his own centre in the same city and become a direct competitor of the centre with which the manager collaborated. *Marco's* learning process had, instead, been facilitated by his friendly relations with the two biologists at the centre: "*They were a Jamaican and an Australian girl. We made friends, we went out together, we went to the pub, and so on*". In *Marco's* story, it was his personal relationship with the two biologists that enabled him to learn what to 'do': "*One of them suddenly asked me: 'have you ever cleaned an oocyte? No. So clean one'*".

This further episode shows how induction to the profession was closely tied to trust relations established both internally and externally to the centre. It took the form of 'seduction' into the profession by peers. This process of developing a passion for the profession, in fact, seems to be the factor that brings novices into its core (Gherardi et al. 2007).

The induction to the practice described (learning how to 'see' an ecograph or clean an oocyte) is situated in the specific context linked with the performance of the work, and well represented by the concept of situated curriculum. There is a body of practical knowledge required to become an 'expert'. This knowledge is eminently tacit and managed collectively by the community of practitioners where novices learn. Hence, induction to the practices of the gynaecological profession at the ART centre offered an opportunity to become expert in the area, depending on the difficulties inherent in the contingent situation and on the novice's ability to

grasp the learning opportunities offered to him. What novices learn depends on the actual practices where they are involved, and on the quality of their participation. Instructions and micro-explanations are dispensed wholly at random, in the sense that they depend entirely on situations as and when they occur.

6.6 Bioartlife: When the Organization Has a Vision

Bioartlife is a large, private ART centre. It consists of a main centre and six satellite (external) centres, whose work is organized in cycles. This means that while the main centre is always open (including weekends), the satellite centres concentrate the core part of their work (i.e. the surgical part, laboratory fertilization and the transfer) in a single week. The frequency of the cycles depends on the number of cases to be treated by each centre. The satellite centres are situated in private clinics staffed by gynecologists and biologists from Bioartlife (who travel between the clinics) and nurses and ward attendants provided by the host clinics. Bioartlife performs around 1,500 treatments per year, half of them at the main centre. It follows, therefore, that Bioartlife has a large staff (around 50 people). It comprises 15 gynaecologists (working internally and externally), 15 biologists (internal and external), 1 psychologist, andrologist, anesthetist, president, storeperson and administrative director, 3 administrative workers, secretaries and nurses, 2 ward attendants, and 4 receptionists. All the gynecological staff were trained in the same university department and are directed by one of the best-known clinicians in the field, who is also the scientific advisor to the centre and has a private office at the Bioartlife centre.

The professionals who started to work in the satellite centres had acquired previous experience in the field of reproduction. The main part of their induction process was their integration with the internal team, which came about by standardizing ways certain procedures and administrative activities were performed. For instance, as the administrative manager said, at one of the last external centres to enter the network, the clinic concerned already had a team consisting of a doctor and a biologist: *“They were obviously professionals who had already worked in this field for a long time, and so the process was more rapid, but nonetheless they underwent an evaluation phase. In this case, they were only required to attend the centre in order to harmonize ways of doing things.”*

During the observation period at the main centre, the sole newcomer (who had been hired only one month previously) was a person assigned to develop a new kind of network with gynecologists who had not previously worked in the specific field of fertility. The work of the new employee was to establish and maintain new relationships with external gynecologists, to increase the number of potential patients. These external gynecologists had a particular position, because they were not (and probably would never be) members of the organization, but they underwent a kind of induction process to work in partnership with the centre. The main activity required of an external gynecologist was the first phase of ovarian monitoring. The centre wanted to give its patients the opportunity to be supervised in the first part

of the process by their own gynecologist or one near where they lived. For this purpose, the external gynecologist, who did the material work, and the internal one, who decided on the therapy, had to collaborate. External gynecologists were not allowed to interfere with therapy management, because responsibility (and power in the relationship) pertained to the centre. For these reasons, the centre was trying to stabilize the relationship between the centre and internal gynecologists with the external gynecologists through a process whereby they monitored patients in a specific way required by the centre. They had to have some specific technologies; they had to follow the instructions given them by an internal gynecologist; and (possibly) they should have a day of induction into the centre when they were supported by the internal gynecologist who would be their referent.

To sum up, the organization established different kinds of routines for the induction of internal staff and external fixed partners in order to ensure control over desired behaviors and transmission of the organizational culture. For all these people, induction was both the process and outcome of a practice in which the organization, the various professional occupations and the peer group were involved, but the organization sought to exert formal control over both the selection process and socialization. For instance, the centre adhered strictly to the standards required by quality certification. According to the description given by the administrative manager, the certification quality rules converged with the organizational ones prior to them: *“The quality discourse has done nothing but induce us to formalize and better specify things that happened in substantially the same way before. The inception processes of both the doctor and the biologist took a very long time, at least one year. I mean, the specialist gynaecologist expert took around a year to familiarize himself with our work model, with our methods. During that year, he obviously passed through increasing levels of autonomy. However, this is a process that cannot simply be studied in a book; you have to acquire an experience and familiarity with these things, which necessarily take a long time.”*

These standards were required not only of medical staff. A new non-medical member of staff shadowed a colleague for a week when they arrived so that they had time to adjust to the job. At the same time, participation was encouraged at social occasions (such as birthdays or other kinds of celebration), social dinners and parties organized by the centre. Induction to this centre involved a tacit dimension of what being a member of the centre meant: sharing professional behaviours and ethical assumptions embedded in working practices. In many interviews, workers at the centre used expressions such as “we do this...”, “we don’t do this...” to signify their involvement in, participation in, and (at least declared) agreement with the centre.

6.7 Three Models of Becoming a Professional

When the induction process is considered as a social practice – that is, in terms of how it usually takes place in a given organization. It assumes different patterns according to the type of organization, and, therefore, according to the ecology of power relations among the three principal agents of the process.

Table 6.1 A comparison between induction practices

Name of the centre	Type of organization	Size	Main agents in the induction practice	Model of induction
Sisma	Public university centre	Medium	The professional community	Socialization precedes selection
Beta	Private centre	Small	The community of practice	Professional seduction
Bioartlife	Private network organization	Big (network of six centers)	The organization	Organizational routines for specific competences

The three case studies that we have presented illustrate three different models of induction (Table 6.1):

- In the professional bureaucracy (Mintzberg 1979) of a university hospital, the professional community exercised almost complete control over the induction of newcomers, who entered the profession first and only, thereafter, the organization. In this case, socialization preceded selection, and the organization did not envisage a formal trajectory of accompaniment upon entry. Moreover, the community of practice constituted a ‘recalcitrant’ socialization agent because the competitive environment regulating access to selection made the sharing of knowledge more forced than freely available to newcomers.
- In the small private organization created by a professional or a group of professionals, the induction practice was almost exclusively managed by the community, and induction into the organization coincided with induction into the profession. In this type of simple bureaucracy, selection took place on the basis of trust relations, so that the type of social capital possessed by the newcomer was decisive for entry. The professionals also controlled the situated curriculum (as in the previous case) which produced the effect of induction/seduction. Passion for the profession and the professional vision were transmitted through participation in working practices because the work environment was collaborative and, in the absence of competitive power relations among peers, knowledge was freely shared.
- In the large network of organizations, the administrative area predominated over the professional one. In this case, the organization had devised formal routines to favour the induction of all competences (commercial, administrative, and professional) within the organization. These arrangements were deliberately created by the organization in order to transmit the organizational culture and to control the network’s performance from a distance. These arrangements were flanked by induction to the profession, which was undertaken by the professionals, although they were subject to close control through the standardization of procedures via the quality control system. Finally, the community was the main agent of socialization as a tacit process. Organizational identity formation and cooperation among peers might or might not come about because the environment was not competitive. To be noted, however, is that, for the community, provenance from

the same university, and even the same department, meant mutual knowledge and development of a sense of belonging. But this access also signified the existence of an “old boys’ network” and of an organization which had a tacit preference among its selection criteria.

We conclude by pointing out that the ‘same’ practice assumes very different situated features, and that a practice-based approach is able to bring out the ecology of actors that locally stabilize a situated practice and reciprocal power relations.

We now turn to how the tensions and the power games between all the actors in the ecology of professional practices may shape the becoming of a professional.

6.8 Becoming a Professional Within a Field of Tensions

The illustration of three empirical contexts allows us to stress the main limitation of both the organizational socialization and community of practice approaches. Both literatures conceive the learning process in a linear way, be it a trajectory in becoming a competent member, or be it a process of peripheral legitimate participation. The advantage of a practice-based approach, on the contrary, consists in giving primacy neither to the subject, nor to the negotiations that take place within the texture of situated working practices, nor to the tensions and contradictions that are generated in the interactions of all the humans and non-humans involved in the ecology.

The idea that tensions are important triggers for learning is put forward by Elkjaer and Huysman (2008: 171) when they note that ‘learning as participation is oriented towards the inclusion of newcomers into communities of practice, rather than the disruptive and confusing elements of admitting membership to newcomers. This means that the gaze is directed towards processes of adoption and adaptation rather than the tensions that may arise from newcomers’ (and others) participation in organizational life and work’. Similarly, within activity theory, the role of contradiction is central for expansive learning to occur (Engeström 1987; Miettinen and Virkunen 2005). When contradictions generate disturbances, problems or break-downs, practitioners elaborate some working hypothesis for a more advanced form of activity or a zone of proximal development that may solve the contradiction. Therefore, we can say that within both a pragmatist approach to learning and activity theory the active role of the subject who enters the organization and takes part in an activity system is acknowledged; and with it the idea of tensions, contradictions and power games is introduced. A practice-based approach looks at how the becoming of a professional is shaped following the resolution of tensions or their coexistence.

From the illustration of the previous three organizational contexts we can appreciate how the process of becoming a professional is accomplished, depending on the situated curriculum that the local community uses, and how the organizational context may vary according to who is the main agent of socialization for the newcomer.

In any case, we see how misleading is the image of a dyadic organization/individual relation that is traditionally portrayed in the organizational socialization literature. On the contrary, we have seen that at least three main agents are at work: (i) the organization, (ii) the community of practice and (iii) the profession. These do not include the individual as an active actor and the material world of artefacts and technologies. Finally, we should not forget that the becoming of a professional does not begin as these individuals enter an organization, because their educational training is already part of the same socialization process. Nor does that the process take place only within the organizational boundaries, because the social world of a profession is wider and it includes not only the professional associations and their power of control over the professionals and on the educational curriculum, but also the development of a professional ethics and aesthetics that contributes to the institutionalization of a professional power and network of political interests.

We do not have enough space here to fully develop the role of materiality in shaping power relations in intraprofessional networks, nor to illustrate how professions and professional practice change in relation to technological innovation. We have done this elsewhere (Gherardi and Perrotta 2011) for more detailed treatment in relation to assisted medical reproduction technological changes. Here, we discuss how the becoming of a professional takes place within a field of tensions and through the provisional and always unstable resolution of tensions.

We shall discuss the main tensions at the following levels: (i) within the individuals and their positioning in the field; (ii) within organizational control and professional control; (iii) within managerialism and professionalism. Our implicit assumption and our critique of the traditional literature on professionalism is that the process of becoming a professional is inherent to the entire working life of individuals and continues throughout their careers.

The focus on individuals allows us to recall that the concept of becoming has its roots in post-structuralism and Marxism (Carlsen 2006: 133), and to consider the constitutive nature of language and structures of meaning, in collective mobilization of beliefs and habits of action as a result of new experiences obtained through interactions.

In a study of the induction practice for becoming customer service officers in a bank, Bjørkeng and Clegg (2010) propose two concepts that illustrate the dynamics among the newcomers, the organization and the profession. The first is authoring acts – the inductees’ processes of making sense of themselves as practitioners – and the second is performative acts, i.e. all acts constituting the object or process of which they are part.

Becoming a practitioner involves narrating self and practice, and narratives are not one-dimensional representations of a reality (Cunliffe 2001); rather, they are multi-voiced, contextually dependent, ambiguous, equivocal constructions of experience, always negotiated between the inductees, the work, and whatever they try to communicate to someone in a given context. In authoring the bank as a familiar place, and themselves as practitioners, the inductees recognise themselves as such, so that by the end of the induction course they have mastered the formal routines, tools, and methods of their working practices.

Another facet of the authoring act that is seldom addressed concerns becoming a gendered professional. Professions are also marked in terms of masculine/feminine cultures, and practicing gender at work (Martin 2006) means also knowing how to perform gender in appropriate ways, where ‘appropriate’ means in accordance with the professional culture and in accordance with the professional’s gender identity. An example of how a young female consultant – Omega – entered a male-dominated profession and community of practice is reported in Bruni and Gherardi (2001). The tensions on her side and the rent position enjoyed by her (male) colleagues were part of Omega’s becoming a professional and learning what is called ‘gender switching’, i.e. the unconscious choice of adhering to a masculinist gender language and resisting it at the same time through appropriate gender displays. Too often neglected in the discourse on becoming a professional are both the gender identity of the practitioner and the practicing of gender at work and in the professional culture. A profession is also structured along gendered lines and gendered activities that here we mention only in passing (Jones 1998).

What we can interpret through the concepts of authoring and performative acts is the interplay and the tensions between becoming a practitioner and constructing practices. In this process, the aspect of constructing professional practices is also linked with the capacity to imagine practices. By considering ‘becoming’ as the imagining of practice, Carlsen (2006: 135) places the authoring of identities within the lived experience of everyday work and its irreducible present-past and present-future temporality. Imagination of practice refers to:

the manner by which an organizational collective assigns social weight to an act, an event, or a stream of acts and events within their living experience by selective attention, appropriation, extension, and amplification, in sum, the storied construction of shared fields of meaning and engagement. Participating in the imagination of practice is, therefore, a collective act in which the becoming of the professional and the performance of the practice co-evolve in the active reconstruction of the past in light of present circumstances and anticipations of the future. (Carlsen 2006: 135)

The second source of tensions in becoming a practitioner is located within the exercise of control in organizations. In the illustration given in the preceding sections we described how Sisma – a professional bureaucracy – relied mainly on professional control, while Bioartlife made use of control over behaviour.

Controls in organizations are necessary to ensure that organizational members direct their efforts towards organizational goals. A classic source of tension in organizations is the relation between administrative managers and professionals, and the inappropriate use of one form of control may lead to organizational ineffectiveness and conflict in interpersonal relations. The choice between behaviour control and professional control is emblematic of how the becoming of a professional is shaped in the relationship between superior/subordinate and, as we shall see next, in the tension between managerialism and professionalism.

Behaviour control consists in close monitoring and evaluation of subordinates’ actions by superiors. Whilst this control has the advantage of being direct and immediate in giving feedback and correcting deviations, it has the disadvantage of being costly and limited to the superior’s span of control. It may, therefore, become

inefficient, and may even reduce innovation and lead to risk-adverse behaviour (Snell 1992). In particular, if behaviour control is exercised over a long period of time when subordinates expect to be professionally controlled, they will perform at a lower level because controls are not aligned with their expectations (Rowe et al. 2012). Professional control has the following characteristics: (i) organizational reliance on self-enforced control, (ii) features like tacit in-group monitoring, and (iii) the symbolic or explicit social sanctions applied to those who do not respect norms. Professional control is more appropriate than behaviour or output control when intense socialization is present and organization-specific skills have been developed (Rowe et al. 2012: 64).

The becoming of a professional encounters the tensions and the gap in expectations between the different forms of control. In fact, the organizational use of behaviour control or output control when professional control is expected may lead to resentment, frustration, counterproductive behaviours and various forms of resistance. On the other hand, professional control is based on a socialization process rooted in long-term employment, rigorous selection and training. All these circumstances are now at risk because the increasing uncertainty, the severance of the employment relationship, and the rate of turnover induce a preference for behaviour control in organizations. Traditional professional control is also challenged by the tensions between managerialism and professionalism.

The conflict between organization and profession has been widely explored. Nevertheless, the terms of this tension are challenged by the changing organizational context of professional work (Farrell and Morris 2003). The reconfiguration of the two fields has been proposed under the label of 'organized professionalism' (Noordegraaf 2011: 1351), which represents professional practices that embody organizational logic. Professionals may take up organizing roles, and professional workers may develop organizational capacities, in order to deal with changing work circumstances. An emblematic example is provided by health organizations where managerial innovation tends to modify traditional professional practices, assigning them new goals and thus reducing professional autonomy. While some authors have seen a challenge to the decline of medical dominance, Freidson (2001) prefers to see a process of 'restratification' whereby an elite stratum of medical professionals is co-opted into management so that the profession can maintain its power. This dynamic also influences multi-professional teams, where health and social integration care generate conflict over the respective jurisdictions, and different professional cultures generate interprofessional tensions (Tousijn 2012). In multi-professional teams, many professionals carry out managerial work. Therefore, what can be deduced concerns not much the decline of medical dominance as the reconfiguration of the professions both internally and in relation to the changing context of other interrelated professions. The 'new' professionalism is constructed more from within than from above (Evetts 2009, 2011).

A final point to be made in regard to all the tensions reflected in the becoming of a practitioner is to acknowledge the professional associations that are external to the single organization in which the professional works but greatly influence the power that a profession may exert on the culture and the practices of that professional.

Regulative bargains between professional associations and the state have enabled professional groups to regulate their own work by establishing meaningful professional standards. Nevertheless, professional associations are just one actor in the institutionalisation process, and their power is challenged by changing employment relationships (Greenwood et al. 2002; Muzio and Kirkpatrick 2011).

When we consider the field of forces that keep together the individual professional, the organization, the community of practice, and the professional association, we see that the process of becoming a professional is not linear, is not harmoniously developmental, is not simply the effect of a socialization process, and does not end in becoming an expert. The concept of becoming includes the idea of an open-ended process in which tensions and contradictions are collectively elaborated and temporarily resolved within a field of struggles.

6.9 Conclusions

Whereas the lens of socialization focuses on the shared norms, values and standards that the professional newcomer internalises to become a competent member of a professional culture, the lens of the community of practice focuses on their peripheral legitimate participation, and both of them privilege the point of view of the individual in relation to the collective. The lens of induction is positioned instead on the eye of the organization and its mechanisms of selection, training and control. Finally, the lens of professional control makes it possible to consider how the professions may enjoy autonomy within the organization and how, through the regulative bargains of their professional associations with the state, they try to exert control on the educational system and maintain professional boundaries *vis-à-vis* interrelated professions. Different lenses not only represent distinct interpretative frameworks; they also express the points of view and the tensions that shape the field of professional practices.

As individuals become professionals throughout their working lives, their authoring and performing acts are accomplished within a field of practices marked by tensions and contradictions among the main agents just mentioned. The process begins before formal entry into an organization, and it continues with the induction into the organization. However, to author an identity as professionals, these individuals become seduced by the profession and author themselves as individuals who 'are' professionals and adjust to the gendering of the profession. In this process, becoming a practitioner and constructing practices is also linked with the capacity to imagine practices, since the authoring of identities emerges within the lived experience of everyday work and its irreducible present-past and present-future temporality.

Through three empirical examples from the medical field we have argued in favour of the situatedness of the becoming process and the difference that the organizational context exerts in shaping the path of the becoming. We have shown that, in a professional bureaucracy, professional socialization may anticipate the moment of becoming an organizational member, whilst in a small professional organization

it is the community that induces and seduces the newcomer, and that in a large managerially controlled organization, induction may be an explicit practice negotiated with the community of practice and the individual.

A final caveat is necessary in regard to the limits of a practice-based approach to induction. Whilst this approach proves its worth in the interpretation of the situatedness of becoming, it implies that any situated practice has to be described in relation to its context, so that we can generalize about it only through its modelling. On the one hand, we need further research to understand what is common across different organizations. On the other hand, we must further test the theoretical framework that we propose, because a practice-based approach to induction is an innovative contribution to the literature and it should be further confirmed, disconfirmed or refined.

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Chapter 7

Productive Systems of Professional Formation

Jim Hordern

Abstract Pathways and processes of professional formation are influenced by relations between professional associations, educational institutions and employing organisations, notions of professional knowledge, and the organisation of professional work. This article advances the use of a productive systems approach to the analysis of professional formation, articulating this with concepts developed in the sociology of educational knowledge and workplace learning that identify how knowledge is appropriated and transformed for professional practice. It is suggested that at different stages of the ‘production’ of professionals the dynamics of formation alter as certain organisations or actors exercise particular influence over a given process or activity. The maintenance of certain forms of social and technical infrastructure, interwoven throughout the stages of production, may facilitate co-operation, aligning goals and reducing tensions in the process of formation. The role of the professional association as a vehicle for formulating the specific logic of the profession, and for brokering relations between key organisations, is examined. Examples from two professions based in the United Kingdom illustrate how the character of professional formation is shaped by how knowledge is valued, the capacity to involve employers in formation processes, the level of engagement that professionals enjoy with other professionals as part of formation, and by the degree of specificity or flexibility legitimated in the pathways constructed.

Keywords Professional formation • Professional associations • Professional knowledge • Productive systems • Recontextualisation

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7.1 Introduction

Research has outlined how the development of the professions and the influence of notions of professionalism have led to particular patterns of work and organisation. Attention has been drawn to the tensions between the logics of bureaucracy, market and professionalism (Friedson 2001), the growth of ‘organisational’ and ‘corporate’ modes of professionalism (Evetts 2004; Muzio et al. 2011), struggles for ‘jurisdiction’ between professions (Abbott 1988), and how professionalism is used to exercise control and discipline at work (Fournier 1999). Professions and professionals can be seen as having specific levels of influence in organisational fields (DiMaggio and Powell 1991), initiating or resisting change and institutionalising forms of work and organisational practice (Scott 2008; Suddaby and Viale 2011). Professional associations emerge as key players as professions change (Greenwood et al. 2002; Noordegraaf 2011), formulating and co-ordinating the frameworks through which professionals are qualified and accredited (Millerson 1964), adapting to, and shaping, the prevailing logic in which the profession operates, and managing transitions to new pathways of formation (Lester 2009). Although the basis for professional legitimacy differs with national contexts, models of professional association with Anglo-American origins have strengthened as a consequence of globalising forces and geo-political change (Evetts 2003; Faulconbridge and Muzio 2012), articulating with growth in forms of ‘civil society’, the rise of a global middle class and the expansion of mass higher education (Anheier et al. 2001; Altbach et al. 2009).

With a greater focus on individuals and their work environments, studies of the development of professional capability and competence have often sought to identify ‘stages’ or ‘steps’ that practitioners pass through in order to ‘become’ professionals (Dall’Alba and Sandberg 2006). Drawing on work in psychology, cultural anthropology and micro-sociology, these and similar studies have indicated the importance of the relation between practitioners ‘in formation’ and the practice contexts in which they become increasingly embedded (Brown and Duguid 2001; Guile 2010). Professional formation can here be construed as a question of the development of skill, expertise and identity (Eraut 1994; Beck and Young 2005), a process in which metaphors of ‘acquisition’ and ‘participation’ (Sfard 1998) reflect professional learning, knowing and knowledge development. These insights may, or may not, influence the development of formal pathways of professional formation that are constructed by professional associations, educational institutions, employers and state organisations.

Much professional formation is a combination of periods of time spent both in formal education settings and organisational contexts, resulting in practitioners ‘in formation’ engaging in cultures that may emphasise both ‘acquisitive’ and ‘participative’ modes of learning (Sfard 1998). Research into communities and networks of practice (Lave and Wenger 1991; Brown and Duguid 2001; Fuller et al. 2005) establishes some of the meso-level conditions that may facilitate participative learning in workplaces, and thus provides a framework for analysis of professional development at work. Radical participative models may assert that formal educational contexts are merely other ‘communities’, albeit often hindered by supposedly ‘redundant’

acquisitive metaphors embedded in the culture of educational institutions (Sfard 1998). Some professional associations may thus suggest that formal 'education' has little to offer, developing new frameworks for accrediting professional capability that conceive professional formation solely in terms of workplace experience.

However, retaining a command of the 'abstractions' that provide a resource to tackle the problems encountered by professional work can be considered a necessary condition for the viability of a profession (Abbott 1988). Where a profession has a technical and scientific base, strong connections often exist between the production of knowledge and its use in professional work (Foray and Hargreaves 2003), driven by scientific research, technological advance and the demands of the clients of professionals for increased quality and efficiency. For example, in the healthcare or engineering professions, professional competence is only sustained if practitioners continually engage with new knowledge (Eraut 1994; Becher 1999; Friedson 2001). The growth and sustenance of professional 'networks of practice' (Brown and Duguid 2001) that can refine and nurture expertise is built upon the foundations of formal scientific and technical knowledge that qualify practitioners for participation. The 'rails laid by practice' (Ibid., p. 204) provide the social and technical infrastructure that enables knowledge to circulate and productive networks to form. However, effective participation in a network relies on participants being conversant with a body of knowledge and how this knowledge is utilised in practice. The 'acquisition' of formal knowledge and the availability of opportunities to participate in relevant 'networks' are thus both crucially important for professional formation.

The important relationship between, and different roles of, formal educational knowledge and the 'art of knowing' (Duguid 2005) is not necessarily recognised, or reconciled, in the formalised processes of professional formation. A traditional process of institutionally based education, remote from the world of work, separated from and followed by immersion into practice environments, can lead to problems with recognition of the different roles, purposes, and 'degrees of situatedness' (Young 2006, p. 115) of different types of knowledge. A lack of practice engagement may also underplay the importance of practitioner capacity to appropriate and transform, or 'recontextualise', knowledge for use in new contexts (Evans et al. 2010; Guile 2010). On the other hand, total immersion in practice without the opportunity to access knowledge beyond the immediate work contexts leads to a neglect of the forms of knowledge that enable practice innovation and the making of connections with other disciplines, practices and contexts (Wheeler 2010; Muller 2009). How 'knowledge' and 'knowing' are conceived and articulated by associations, employers and educational institutions has considerable influence on how pathways of professional formation are structured. How different forms of knowledge are 'enmeshed' (Breier 2004) or interrelated in education and practice may or may not be recognised and enacted in the structures, curricula and pedagogy involved in professional formation.

The arguments above suggest that professional formation is constituted through the relation between education and workplace practice, and shaped by the wider context in which professionals operate. This article discusses an approach that can be used to interpret the context of professional formation, drawing on research into

the sociology of professional and workplace knowledge and learning, the changing dynamics of professional practice, and the roles and relations of professional associations. The productive system approach illustrated below is seen to have particular value as a consequence of its capacity to identify changes in levels of mutuality and relative power at different stages of formation, and to scrutinise the roles of key agents and the explicit and implicit contracts they hold with other bodies. Using examples from two professional bodies based in the United Kingdom representing surveyors and human resource professionals the structure and stages of different pathways towards professional accreditation are outlined. It is argued that pathways of formation are influenced by the infrastructure of social and technical relations that support formation, and considerations of what constitutes valuable professional knowledge. Forms of knowledge vary in their significance depending on the pathway, and this is reflected in the attention given to differing sites of knowledge production and processes of workplace and learner recontextualisation. The analysis of a productive system enables scrutiny of the context of formation, and the identification of how different pathways to professional status are predicated on specific conceptions of professional knowledge and competence.

7.2 Pathways to Professional Formation

Certain professions and vocations have structured pathways of formation that, historically, have been mandatory for those who wish to achieve full accreditation as a professional. This is particularly true of the more 'traditional' professions, such as Medicine and Law, where higher level qualifications followed by periods of gaining experience under the supervision of more experienced practitioners have been the norm (Becher 1999; Friedson 2001). In contrast, other occupations, particularly those where professional qualification has not been essential, or where experienced people from other walks of life have been able to demonstrate their competence relatively easily, have operated more flexible processes of recognition. For example, in many of the business related corporate professions the notion of any structured 'formation' may be largely irrelevant, when 'professionalism' is dominated by prevailing organisational or market imperatives (Muzio and Kirkpatrick 2011; Evetts 2004, 2011). In such cases the mode of work organisation may have a greater impact on what is valued as professional knowledge.

With the changing nature of work some professions have struggled to delineate their boundaries with cognate professions that have similar knowledge bases, and to establish routes to accreditation that reflect all routes to professional competence. The notion of 'jurisdiction' is significant here, with professions competing to be recognised as having authority over an aspect of work (Abbott 1988). However, as technological, regulatory and social changes fracture old boundaries, there is a constant need to re-delineate jurisdiction, negotiating to capture a segment of the shifting sands of contemporary economic life. Thus professions may feel compelled to make pathways to professional status more flexible or more restrictive depending on the

changing nature of work, the knowledge required for professional practice and the strength of forces of competition and integration with other professional domains. Greater flexibility may have the advantage of facilitating the recruitment of new members from other professions with similar knowledge bases, whereas restrictiveness may be perceived as maintaining greater exclusivity or may be a necessary response to regulatory change.

Pathways of professional formation may also need to adapt to the level and nature of demand for entry into the profession, to labour market circumstances and changing patterns of formation elsewhere, and to demands for accountability and transparency. If a pathway to formation is considered to require too much personal investment for too little reward in terms of professional status or income, it may be necessary for a profession to consider making changes to maintain the quality and volume of recruitment required. On the other hand, if there is excess demand or a perceived dilution of quality of prospective professional, there may be calls for making entry more difficult, or to make aspects of formation more challenging. The pool of available recruits to the professions is arguably deepening and broadening, with considerable increases in graduate numbers in many countries, and the greater flexibility and mobility of skilled labour in the global economy (Brown and Hesketh 2004; Brown and Lauder 2006). However, levels of demand for entry to a given profession do not only depend on economic prospects, job security, levels of autonomy and difficulty of qualification. Certain professions, for example architecture, retain high status and high demand despite patterns of job insecurity and underemployment (Becher 1999), due perhaps to persistently attractive socially-constructed notions of certain forms of work.

The degree of flexibility available in formation will also depend on whether a 'licence to practice' system regulated by statute or through voluntary agreements exists, with some pathways of formation bound to comply with rules regarding experience and qualification content. Meanwhile, increasing requirements for professional accountability and transparency (Power 1999; Fournier 1999) translate into an onus on professional associations to clearly outline the standards and competences expected of practitioners, and for practitioners to evidence their continuing professional development (Lester 2009; Friedman and Phillips 2004). Transparency can thus provide a guarantee of quality to the profession's 'clients', which may include the public and government, as much as to potential recruits to the profession from universities, schools or the wider labour market. In some professions an academic qualification will be a pre-requisite for, or even designate, professional status, whereas in other professions accreditation processes may be purely based on experience at work. The increased significance of qualifications has been a characteristic of professional life (Millerson 1964; Friedson 2001), and these qualifications can involve various combinations of academic study and workplace experience in an integrated fashion (Lester 2009) that aims to maximise opportunities for the practitioners in-formation to perceive the relation between the professional knowledge base and the contexts of its application.

Lester (2009, p. 228) usefully identifies four categories of professional formation pathways, labelling them 'sequential', 'parallel', 'integrated' and 'experiential' routes.

Sequential routes involve full time study followed by a period of time under supervision in practice, corresponding to the 'traditional' formation pathway for many of the classical professions. The parallel and integrated routes involve concurrent combinations of study and workplace experience over a period of time, with the 'integrated' route specifically focusing on maximising the connection between study and practice. The experiential route, however, is based on learning through practice, with additional independent study or short courses as necessary. Lester (2009) notes how professions differ in the number and type of pathways available, and also in the volumes of recruits using those pathways. Certain assessment and accreditation processes predominate depending on the specificities of the route, including examinations common where formal education and training is involved, and forms of practice-based assessment, which may also be used to ensure ongoing proficiency (Lester 2009). For those professions with more flexible entry standards, the submission of evidence of prior qualification, comparable professional membership or experience may be sufficient.

There is also evidence that pathways to professional formation are being opened to those who have entered the occupational field in supporting roles. These pathways may involve study support if necessary, or new forms of mentoring, short courses and assessment that are specifically designed to support a 'step-up' route to full professional status. The accountancy professional bodies in the U.K. have ensured that a work-based technician route is integrated into pathways to full professional membership, as discussed by Young (2011, pp. 271–273), and the U.K. legal profession is considering opening a new pathway to full professional status via a 'higher apprenticeship' (Skills for Justice 2013), as part of broader trends that challenge traditional models of legal education (Wiseman et al. 2012). U.K. based Professional bodies with global ambitions such as the Chartered Institute of Personnel and Development and the Royal Institute of Chartered Surveyors have recently introduced 'Associate' levels of membership that facilitate progression to full membership. These routes may enable those staff in assistant or technical support roles in a wider range of organisations to access the resources of their professional community, and to broaden practice networks within the professions concerned (i.e. see Goodhead 2010 for discussion for Chartered Surveyors).

Such developments may not be solely about benignly supporting individual career progression, however. New entry pathways can be seen as aligning with the 'professional projects' (Larson 1977) that professions develop in pursuit of greater status, positioning the professional body in the ongoing competition for members between organisations both within an occupational field and between cognate professions. They may also reflect changes in the division of labour that professions feel compelled to adapt to in national contexts where regulatory constraints on occupational change are limited, in contrast to continental European models where the state provides a greater bulwark against change (Karseth and Nerland 2007; Torstendahl and Burrage 1990). A greater diversity of pathways to professional formation can also circumvent or provide alternatives to traditional graduate entry routes, and demand for these alternatives may grow in countries where the cost of higher education is increasing (Altbach et al. 2009; Universities UK 2012). Employers

may also support the expansion of alternatives as they scrutinise the cost of employing graduate level staff, and recognise the potential for engendering commitment to organisational objectives by supporting formation internally. Moreover, the growth of flexible experiential routes that shift the burden of professional formation onto practitioners can be seen to reflect changes towards the 'self-management' of careers (Grey 1994), and the salience of attitudes towards the development of professional knowledge that are 'learner-centred' and routed in social constructivism. This flexibility and learner-centeredness may articulate with an increasing 'genericism' in the professional knowledge base and a concomitant weakening of professional identity (Bernstein 2000; Beck and Young 2005), as relationship management and client-focus skills are foregrounded in professional competency frameworks, overshadowing greater engagement with disciplinary knowledge. Thus, practitioners entering a profession via work-based experiential routes may lack the opportunities to acquire the types of knowledge that enable their full participation in the professional community, and the wider labour market, over the longer term.

7.3 Using Productive Systems to Interpret Professional Formation

Following from the argument developed above, there is a need to develop approaches that can identify and characterise the factors that influence the pathways and structures through which professional formation takes place. The process of professional formation can be interpreted through the lens of a 'productive system' (Wilkinson 2002; Felstead et al. 2009) in which the forces of production 'combine in production' (Wilkinson 2002, p. 2), to create professionals with an acknowledged and valued level of capability. The notion of the productive system was originally developed by Wilkinson (1983; 2002) as a counterbalance to the perceived hegemony of neo-classical approaches to macro-economics. Wilkinson (2002) sought to challenge these on the grounds that a sustainable system of production required co-operation between those involved and some confluence of mutual interests to achieve 'operational and dynamic efficiencies' (Ibid., pp. 2–3). In so doing an analytical approach was developed which could potentially be used to analyse a range of industrial and non-industrial contexts which involved the pursuit of a shared objective of production. Wilkinson foregrounded the role of the social relations of production in 'determining the effectiveness of technical co-operation' (Ibid., p. 3), recognising that both 'mutuality' and 'power asymmetries' (Ibid., p. 4) will have bearing on the character of a given system. The productive system is historically contingent and continuously evolving, with each system 'subject to continuous change from the interactions among the technical, economic, social and political forces to which they are subject' (Ibid., p. 6). Using productive systems to analyse the context of learning at work, Felstead et al. (2009, pp. 19–21) introduced the notion of articulation between the 'structure' and 'stages' of production, with the 'structure' representing

the 'constituent network' (Ibid., p. 20) of actors interested and involved in production, and the stages the various steps involved in a work activity or organisational process.

Whereas Wilkinson (1983; 2002) focused primarily on macro-economic systems and Felstead et al. (2009) on analysing the context of learning at work, the objective of developing a productive system of professional formation is to concentrate on the forces which combine to 'produce' professionals through formal pathways to professional status. Wilkinson's 'forces of production' included 'labour', 'the means of production', 'the social system in which production is organised', 'the structure of ownership and control' and the wider 'social, political and economic framework' (2002, p. 2). Applying these to the context of professional formation suggests that 'labour' may include teachers, trainers or the professional themselves, whereas the 'means of production' may include mechanisms or pathways for education, training and accreditation, and the resources associated with these. The process of production of 'professionals', or what Abel (2003, p. 475) terms the 'production of producers', can be seen to proceed through a series of stages or steps that may involve studying in educational institutions and immersion in the practice of workplaces, usually punctuated by forms of accreditation or recognition of knowledge, skill and competence. Interpretation of the 'articulation' of the 'stages' with the 'structure' of the productive system (Felstead et al. 2009), and the conflict and co-operation which results, is essential to comprehending how and why pathways through the system are constructed, and for ascertaining the flexibility of the pathways, the roles of those involved, and the sustainability of the system. Building on the work of Felstead et al. (2009), the version of productive systems analysis presented here particularly emphasises the extent to which roles and relations change in the structure of productive *within* the course of the productive process as different stages are enacted (Hordern 2012, 2013b).

A structure of production of professional formation thus comprises a constellation of professional bodies, educational institutions, dominant firms and organisations that make decisions about pathways towards professional status. The interactions of these bodies are influenced by the 'norms of appropriateness' that are embedded in routines and practices of the profession and its dominant organisations (March and Olsen 2004; DiMaggio and Powell 1991), much of which may derive from the historical context and tradition of the profession. Together the constellation and the norms provide a structure which articulate with each stage of formation differentially depending on the nature of the stage. In other words, certain bodies, institutions, partnerships and relations may have particular significance at particular stages. Thus, an archetypal productive system of 'traditional' professional formation involving an initial degree qualification and a period of supervised experience, for example in Medicine or Law, could be characterised by high levels of influence from higher education institutions at the early stage followed by greater influence from employing organisations and the professional body at the latter stages. Analysis of the structure of production can also be seen as a means of illuminating the 'soft infrastructure' (Benner 2003; Amin and Roberts 2008) of social and technical relations that support the productive process, highlighting the distribution of trust and opportunities to 'expand learning' beyond the confines of an organisation (Fuller and Unwin 2010).

The configuration of relations in any given system may also lead to certain forms of explicit or implicit contracts which embed relations between particular actors (Friedman and Miles 2002), impacting on whether shared understandings of professional formation develop across the system or remain fragmented. The extent to which shared understanding develops may be particularly important in relations between employers and educational institutions (Reeve and Gallagher 2005; Hordern 2013a).

It would, however, be misleading to assume that the organisations and individuals represented in structures of production are inclined necessarily towards co-operation (Wilkinson 2002; Felstead et al. 2009). The development of agreed process is contingent on the recognition of mutual interests and decisions to pursue them, and these circumstances may be subject to changes in the social, economic and political environment. Thus, for example, employers, professional bodies and higher education institutions may recognise the value of co-operating in processes of formation, but may be reluctant to do so due to political or economic uncertainty. Equally, once pathways of formation become embedded they may acquire a degree of institutionalisation, with forces within the structure of production supporting their continued existence.

Professional formation involves the acquisition, application and transformation of different forms of knowledge, obtained from different sources and used in various contexts (Evans et al. 2010). A practitioner who follows a 'traditional' or 'sequential' route of a full time academic qualification at an educational institution followed by supervised experience and further qualifications in the workplace engages with knowledge differently from a practitioner whose route is entirely work-based or 'experiential' and may be located primarily or entirely within one organisational context. Processes of 'recontextualisation' occur, involving the appropriation and transformation of knowledge, in and between sites of knowledge production, curricula, pedagogy and workplaces (Evans et al. 2010; Bernstein 2000). The knowledge that is 'generated and practiced in one context' is therefore 'put to work in new and different contexts' (Evans et al. 2010, p. 246). Practitioners, as communities of learners or individuals, reshape knowledge for their own practice, bringing their own 'learning territories' or 'personal knowledge' into the context (Eraut 2007; Fuller et al. 2007; Felstead et al. 2009; Evans et al. 2010). Knowledge can be described as technical and cultural, conceptual and contextual, procedural and processual, academic and practical (Becher 1999; Eraut 1994, 2007; Muller 2009). Additionally, it can be explicit or tacit, or partially explicit, embodied in a range of tools, routines and practices (Guile 2010). It can also be specific to an immediate task, or relate to broader conceptions of the work process (Boreham et al. 2002). Pathways of formation therefore entail engagement with particular admixtures of professional knowledge, but individual practitioners may select, appropriate and transform knowledge differently depending on their own personal histories and inclinations.

Much work in the sociology of the professions maintains the importance of the link between academic knowledge production and the professional knowledge base, identifying a role for abstract knowledge in the ascription of social legitimacy to the profession and in providing a resource for meeting the challenges of practice (Abbott 1988; Friedson 2001). Institutional work identifies professions with 'theoretic

cultures' (Donald 2000 cited in Scott 2008) that define the profession and establish professional authority over a jurisdiction (Scott 2008; Abbott 1988). Meanwhile, sociologists of educational knowledge have asserted that knowledge acquired through academic disciplines should be clearly differentiated from knowledge acquired through 'everyday' practice (Young 2008; Muller 2009; Shay 2012). This work builds on Bernstein's (1999, p. 159) delineation between 'systematically principled' and 'context dependent' forms of knowledge, and Durkheim's (2008) identification of the significance of notions of the 'sacred' for the development of abstract thought and social structure. The formation of the professional knowledge base arises through the appropriation and transformation of knowledge from academic disciplines and the domain of practice to meet the requirements of the profession (Bernstein 2000; Barnett 2006; Muller 2009). The 'sacredness' of the professional enterprise is sustained through the formulation and maintenance of a viable theoretic culture that reflects both the socio-cultural hinterland of the profession and its changing role in society. However, the legitimacy this sacred knowledge base provides must be balanced with a functionality that enables knowledge to be 'put to work' successfully in practice contexts (Abbott 1988; Evans et al. 2010; Guile 2010). Professional associations, through the links they maintain with educational institutions, workplaces, and with professionals themselves, have a key role in achieving this balance. The following section examines the influence of professional associations in the process of formation.

7.4 The Role of the Professional Association in the Structure of Production

In systems of professional formation actors in the structure of production may include educational institutions, professional associations, employers, government or regulators, and unions or other representative bodies, some of whom may work in forms of partnership to deliver a particular stage of a formation process. The role of the professional association is posited here as generally having considerable impact on a productive system of professional formation, reflecting models of professionalism that are dominant in a variety of national contexts, and may be reinforced by supra or transnational processes (Faulconbridge and Muzio 2012). Of course this is by no means characteristic of all professions in any national context, as the role of governments or other professions may be particularly prominent in the shaping of formation for specific professions.

Historically considered a defining feature of the Anglo-American model of a profession (Millerson 1964; Abbott 1988), the association or professional body is customarily the vehicle through which professional change is subjected to 'intra-professional legitimation' (Greenwood et al. 2002, p. 61), and the forum through which professional education, culture, behaviour and standards are maintained (Noordegraaf 2011; Millerson 1964). Theories which posit professionalisation as a progressive process have identified the creation of a professional association

as a key indicator of professional organisation (Wilensky 1964). However professional associations are not static, unitary entities that conform to an ideal type. They can be heavily influenced by the interests of key employers within the professional field (Greenwood et al. 2002), causing the association to adapt modes of professionalism to the strategies of those employers and their responses to market conditions or technological change. They may primarily act to reproduce or conserve professional identity, or initiate and lead change to the profession (Greenwood et al. 2002, p. 73; Noordegraaf 2011). Professional associations may negotiate and iterate the pathways to accreditation, stipulating the standards required for professional status, and co-ordinating the contributions of educational institutions, employers and experienced professionals to 'produce' a professional. How the professional association envisages these contributions and partnerships, with an orientation towards inviting structured co-operation, or a tendency towards greater flexibility, reflects how the profession sees its objectives, social role, and connection with sources of knowledge.

In essence the professional association provides the forum through which the particular logic of the profession is maintained, iterated and translated into processes of professional formation, ensuring the 'sustained resilience of professional practices' (Greenwood et al. 2002, p. 62), but also supporting the profession more or less effectively to adjust to jurisdictional or organisational change over which the profession may or may not have some influence. Thus professional associations can both lead and be led by change, facilitating a shared reconceptualization and redefinition of the problems over which the profession has jurisdiction and providing a space for 'theorisation' (Greenwood et al. 2002, p. 74), or complying reactively to pressures from dominant organisations or factions within the profession, or the actions of other professions. The spectrum of available actions available will, in part, reflect inter-professional relations, which may be conflictual, co-operative, or characterised by implicit or explicit hierarchies (Abbott 1988). Changes in the system of professional formation may lag behind reform processes within the profession, as educational institutions and workplace activities struggle to adapt to the dictates of the profession. Thus the 'schooling and socialisation processes' of the profession may fail to cohere with the realities of professional work, and the pressures of organisational life (Noordegraaf 2011, p. 466). Relations between the agents and actors in the productive system of professional formation are therefore a vital factor in negotiating, agreeing and communicating change in the content and structure of formation.

The organisational context of work also matters for professional formation. Within larger organisations, culture and behaviours may vary between functions, and with different workplace practices (Brown and Duguid 2001), and there is the potential for tension between professional and organisational norms (Ackroyd 1996). For those working in smaller organisations, the importance of tapping into the networks of practice that are supported by the profession or by larger organisations often becomes crucially important (Becher 1999). Professionals may have the capacity to ensure that organisational forms and processes reinforce their professional dominance (Suddaby and Viale 2011). However, the nature of this capacity is surely

dependent on the extent of 'organisation' in the profession itself, as reflected by the efficacy of its representative bodies, in addition to the scope for maintaining forms of 'closure', protecting jurisdictions and controlling work within organisations (Abbott 1988; Ackroyd 1996). While doctors, accountants and lawyers may become 'lords of the dance' (Scott 2008) with the capacity to orchestrate work processes, those professionals with less influence are less able to resist the competing logics of the market or bureaucracy, compelled to comply and compromise in the ongoing reformation of their professionalism. Arguably, it is the professional association, representing the 'collective structure' of the profession (Greenwood et al. 2002, p. 75), that has the potential to reconcile the tension between professional and organisation imperatives, expressing this through professional education amongst other mechanisms (Noordegraaf 2011). The examples outlined in the following section demonstrate how professional associations seek to negotiate these tensions and formulate a specific logic that is perceived to meet the needs of their profession and its practitioners.

7.5 Two Professions and Their Productive Systems of Formation

In this section the productive systems of professional formation of two professions are discussed and compared to exemplify and expand on how productive systems operate. This serves to illustrate how various aspects of the social and technical relations interwoven between structures and stages of production promote different types of formation. The social and technical relations of production are influenced by a series of factors. These factors include how knowledge is valued by the profession and the concomitant pressures that arise to sustain the knowledge base, the capacity to tie employers in to professional formation processes, the level of engagement that professionals enjoy with other members of the profession and related professions as part of formation, and by the degree of specificity or flexibility legitimated in the pathways available. The extent to which a given profession can alter the circumstances of formation is also constrained by how the work of that profession is organised.

The two professions discussed here, surveying and human resource management (HRM), are governed by different professional associations and regulative frameworks in different countries. The foregoing discussion focuses primarily on the U.K. context, where the relevant professional bodies are the Royal Institution of Chartered Surveyors (RICS) and the Chartered Institute of Personnel and Development (CIPD). However, the examples also have relevance outside the United Kingdom, as the RICS also has a considerable international presence, including in Asia, Europe and the Middle East, and the CIPD actively recruits internationally and supports the growth of new national associations (Farndale and Brewster 2005). The RICS and the CIPD have much in common and yet differ significantly. Both are 'qualifying associations' that seek to represent and accredit their members, and to engage

actively in marketing the benefits of membership (Millerson 1964). Neither of the two professions are able to claim command of a domain of work, or jurisdiction, that can be legally enforced and thus both have to identify other resources in order to assert their professional authority (Scott 2008), as can be seen through the actions of their professional associations (Hannah et al. 2009; Gilmore and Williams 2007). Both professions are experiencing the pressures of competition from other professions which share aspects of their knowledge base and are under pressure to remodel their professionalism to meet organisational, market and technological imperatives. Concerns around professional competence have led to reforms of membership structures and qualifications, as both associations struggle to maintain coherent bodies of knowledge in the face of economic and occupational change (Karseth and Nerland 2007). This suggests that the professions may be unable to exercise full control over the ‘abstractions’ or the problem definitions that relate to their professional work (Abbott 1988). Such a context suggests that the relations formed between associations, educational institutions and employing organisations in the structure of production are fundamental in managing change and ensuring professional stability and vitality.

Notwithstanding these similarities there are differences in the factors affecting recruitment and employment in the two professions (Hannah et al. 2009; Hollist 2012) and the organisation and character of the work their members perform. It could be argued that surveying maintains some of the characteristics of a classical ‘occupational’ mode of professionalism, including notions of autonomy and independent expertise, whereas human resource work exhibits more of the characteristics of ‘organisational professionalism’ (Evetts 2004), focused on demonstrating its effectiveness as a ‘business partner’ as a means of affirming its value within organisational contexts (Francis and Keegan 2006). (Becher (1999, p. 16) categorised the professions in terms of whether they are generally ‘rule-governed’ (procedural) or dependent on ‘a mastery of process’ (processual), and whether they are technical or non-technical in orientation. Human resource work can be seen as largely non-technical and processual with some procedural elements, although the procedures used may be derived from the organisational context as much as the professional knowledge base. On the other hand, surveying has both technical and non-technical elements that reflect its ‘broad church’ of specialisms and has a processual focus on projects and problem-solving rather than pure procedural application.

Chartered surveying encompasses a wide range of professional areas, from land surveying to valuation, building surveying to project management, with possible duplications of the competences of other professional bodies operating in fields as wide ranging as engineering, architecture, and law. The progressive expansion of surveying specialisms has led to some criticism of the perceived diminution of professional identity (Hannah et al. 2009). The lack of an exclusive ‘licence to practice’ in the U.K., enjoyed by surveyors in some other countries, has ensured a degree of competition for members, and facilitated the reconfiguration of initial professional formation for chartered surveyors (Hannah et al. 2009). In 2000, after some resistance from key stakeholders, the RICS started to implement the Agenda for Change (A4C) (Plimmer 2003). Key developments resulting from this included the

introduction of ‘partnership’ arrangements between the RICS and higher education institutions which are intended to maintain the quality of initial formation and the development of new routes to qualification (RICS 2008a; Plimmer 2003). Currently, most surveyors enter the profession via a related undergraduate or postgraduate degree, followed by 2 years in the workplace to complete the Assessment of Professional Competence (APC) (RICS 2008b). However recent reforms have seen the introduction of an Associate pathway into the profession, as noted above, intended for those employed in technical and supporting roles without relevant degrees, a Professional Experience route to membership, and an Adaption route which is designed for those qualified with other professional bodies who are interested in becoming Chartered Surveyors.

The CIPD has a membership body consisting of professionals involved in human resource management and development. Although the overlaps in competence with other professional bodies are perhaps less obvious than in the case of surveying, there are bodies such as the Institute of Training and Occupational Learning (ITOL) and the British Institute for Learning and Development (BILD), with whom the CIPD may compete for members. A greater difficulty within the CIPD has been to find pathways to professional recognition that maintain a coherent professional identity and yet provide sufficient space for specialisation. In part these difficulties can be seen a legacy of the merger in 1994 of the Institute of Personnel Management and the Institute of Training and Development that created the current body (CIPD 2012a), but also the tension between the ‘welfare’ role of ‘personnel’ and the ‘business partner’ role of HRM (Francis and Keegan 2006). There is an acknowledgement in the CIPD that the profession still has more to do to justify its value, but this appears to increasingly be in terms of organisational value rather than in relation to individual employees (Gilmore and Williams 2007; Bailey 2011). This ‘corporatisation’ of the profession (Muzio et al. 2011), driven by the perceived inevitability of changes in the emphasis of human resource work and the need to appeal to prospective and current practitioners, can provide an explanation for reforms to initial professional formation. New membership categories, qualification structures and pathways to recognition have been introduced recently, including greater potential for gaining membership through specialist qualifications in HRM and HRD that arguably echo the pre-merger distinction between personnel management and training, an Associate grade of membership, and pathways that enable accreditation via the ‘Experience Assessment route’ which does not involve taking a qualification (CIPD 2012b).

7.6 Structure and Stages of Production of Chartered Surveyors

The diagrams below set out the structure and stages of ‘production’ of chartered surveyors that applies in the United Kingdom, and to a considerable extent in the other countries where the RICS is increasingly prominent, including in Asia, parts of Europe and Oceania. Diagram 7.1 outlines the structure of production, sketching the various organisations and institutional influences on the productive process, and

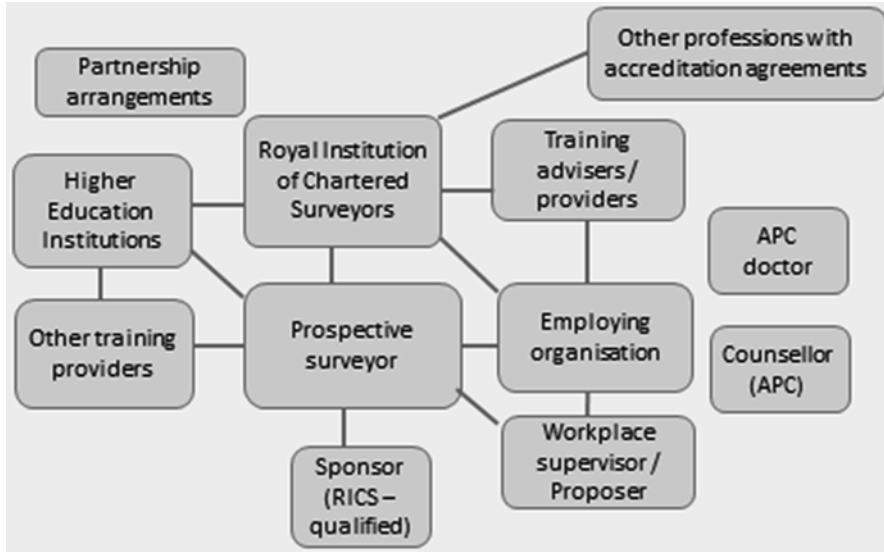


Diagram 7.1 Structure of production (chartered surveyors)

here this also includes individuals (APC Doctor, Counsellor, Workplace Supervisor) who are appointed to particular roles to support prospective surveyors pass the Assessment of Professional Competence (APC) and thus become full members of the RICS. In the case of Chartered Surveying the productive system involves ‘partnership arrangements’ between the RICS and higher education institutions which aim to provide a guarantee of the quality of surveying education (Plimmer 2003), and are designed to ensure there is transparency for all parties around the status of qualifications. As discussed above Chartered Surveying is a profession with multiple competences, many of which ‘overlap’ with other professional bodies, and thus the RICS has relationships of both collaboration and potential competition (Hannah et al. 2009; Ratcliffe 2011). Decisions about professional formation are thus ‘structured’ by concern about these relationships, and changes made by other professional bodies in terms of their membership opportunities. A professional body such as the RICS is concerned about its presence and its reputation, and this will impact on finding an appropriate balance between maintaining rigorous entry standards for membership and ensuring healthy recruitment. In addition, the RICS maintains relationships with many surveying firms, and is responsible for regulating those firms that have over 50 % of partners and directors that are chartered surveyors (RICS 2012a). The RICS Rules of Conduct for firms include a stipulation that all firms have ‘the necessary procedures to ensure that all its staff are properly trained and competent to do their work’ (RICS 2012b, p. 5). This ensures a direct link between the RICS and firms employing prospective surveyors preparing for the APC, and provides the RICS with greater influence in the productive system. It does not, of course, exclude cognate professionals from carrying out work that can be defined as ‘surveying’. Overall the structure of production illustrates the various forms of implicit and explicit contracts made between stakeholders as they combine

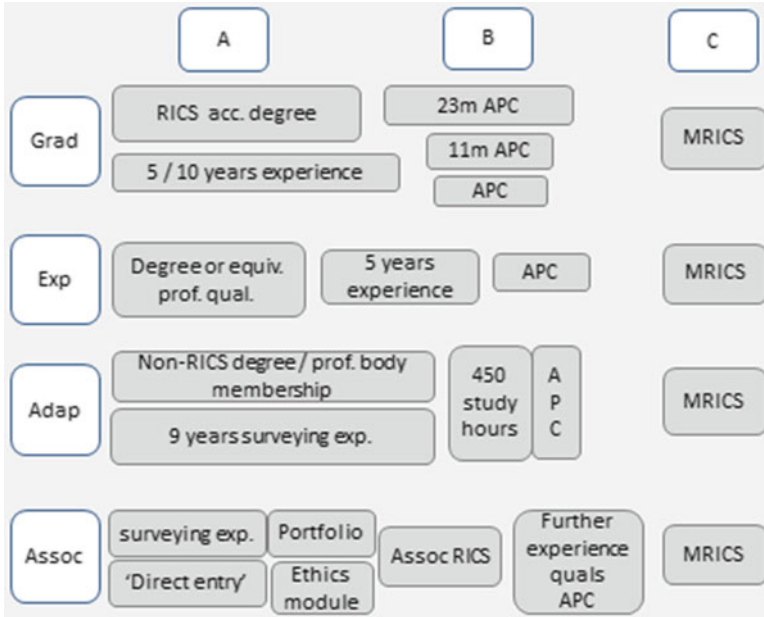


Diagram 7.2 Stages of production (chartered surveyors). *Grad* graduate route, *Exp* professional experience route, *Adap* adaptation route, *Assoc* associate routes (experience and direct entry), *MRICS* member of Royal Institution of Chartered Surveyors

forces to ‘produce’ chartered surveyors, with the RICS playing a key role in ensuring the ‘compatibility’ of relations (Friedman and Miles 2002; Wilkinson 2002).

The pathways that prospective chartered surveyors can take towards professional formation are outlined below. There are a number of routes available, including the graduate, professional experience and adaptation routes towards full membership (MRICS) and the opportunity to achieve an Associate level of membership (Assoc RICS) through qualification or membership of another professional body (direct entry) or by experience and the submission of a portfolio. Whereas the graduate route is the ‘traditional’ and ‘sequential’ route to membership, combining a higher education qualification and a period of structured training towards the APC, the professional experience and adaptation routes provide alternative ‘experiential’ pathways for those practitioners who may have entered surveying employment from other professional backgrounds or have entered surveying via a non-relevant degree. The routes recognise the diversity of surveying employment, and the ‘overlaps’ in competencies with other professions.

Diagram 7.2 above the four pathways of formation are each broken down into two stages which correspond to initial experience and knowledge (stage A) and the process of accreditation for Full or Associate membership (stage B). In the cases of those who take an RICS degree before proceeding to surveying employment on the Graduate route (Grad), the partnership arrangements between the RICS and

higher education institutions have particular influence at Stage A, whereas in the professional experience route or the adaptation route, experiences within the workplace or as part of another professional body have greater bearing on formation. At Stage B on the graduate route a prospective surveyor must generally engage in 23 or 11 months structured training before completing the APC. The training process involves working with, and being supervised by, colleagues, managers and RICS qualified surveyors in the workplace. This contrasts with the greater flexibility on the Adaptation or Professional Experience routes, where the prospective chartered surveyor has greater flexibility in preparation for the APC, although this still involves an assessment process that may result in applicants being asked to acquire further relevant knowledge and experience. Additionally applicants via these routes must have a sponsor who is a member of RICS, and in the professional experience route a proposer, who must be a member of the employing organisation (RICS 2012c; 2011). Although there are now a multiplicity of routes to full membership of the RICS which will open up the potential of membership to a wider spectrum of practitioners, the routes remain specific in terms of the type of knowledge, the extent of experience and the steps that a prospective member must take.

7.7 Structure and Stages of Production of Human Resource Professionals in the U.K.

In the case of the CIPD, as outlined in Diagram 7.3 below, the structure of production of professional formation is less dense than the RICS, with fewer organisations and individuals involved in the processes and minimal contractual activity between stakeholders. This can be seen as a reflection both of the relatively few professional associations that overlap with the competence of the CIPD in the United Kingdom context, and of the pan-sectoral nature of human resource work. Whereas surveying work is located in particular sectors of the economy and tends to be organised in professional service organisations, human resource management and development is involved to some extent in most forms of organisation, although it may not always be a specialist function. Indeed it can be suggested that it is precisely the diffusion of responsibility for many aspects of human resource management to line managers throughout organisations that has undermined the effectiveness of HRM (McGovern et al. 1997; Cunningham and Hyman 1999), and thereby the status of HRM as a profession. A challenge for the CIPD is to make membership attractive to those involved in human resource work, although here it is also helped by the steady demand for employment in HR and for higher qualification levels in the U.K., Ireland and internationally (Hollist 2012; Lengnick-Hall and Aguinis 2012). This can result in organisations using CIPD membership as a means of differentiating between applicants in recruitment processes. Unlike the RICS, the CIPD is not in a position to develop extensive co-operative links with individual employers relating to professional formation, due to the diffusion of human resource professionals across all organisational types, and therefore the

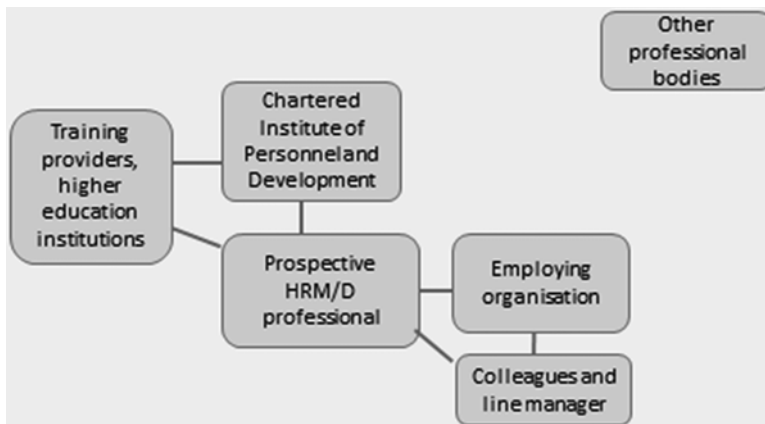


Diagram 7.3 Structure of production (human resource professionals)

development of a registration or regulatory operation for ‘HRM organisations’ is not viable. Diagram 7.3 therefore illustrates a scenario in which a professional association has assumed a pre-eminent role in the structure of production, but the influence that the association might bring to bear on formation processes may be constrained by the lack of viable links with sources of abstract knowledge (i.e. educational institutions) and workplaces (i.e. via organisations).

The stages of professional formation that lead to CIPD membership have recently been substantially revised as part of the CIPD review that has led to the HR profession map, new qualifications at level 3,5 and 7, and a new membership structure. In Lester’s (2009) terms, routes to CIPD membership have characteristically been predominantly ‘parallel’ rather than ‘sequential’ with HR practitioners studying while in work. However the recent reforms have also led to the development of a new more experience based route to membership (EA), and the introduction of greater flexibility through accreditation based primarily on competence rather than qualification, and are justified in terms of the ‘changing needs of the profession and the expectations of employers’ (CIPD 2012c). Arguably this flexibility puts considerable emphasis on the role of the prospective member in managing their own learning and ensuring they access the opportunities to develop the appropriate competences. Such an approach may work well for some prospective members. However, for others there may be difficulties due to the reluctance of employers to offer discretion and challenge at work (Felstead et al. 2009; Gallie et al. 2009). There is no equivalent to the adaptation route offered by the RICS, as there are fewer cognate professional bodies, and those entering from other professions could now use the Experience Assessment route. Although there are many higher education institutions offering CIPD qualifications, prevailing beliefs in the practice orientation of HR knowledge may indicate that stronger engagement with higher education institutions is unnecessary. The CIPD has its own extensive training operation, and thus relations with higher education institutions may be competitive as well as collaborative.

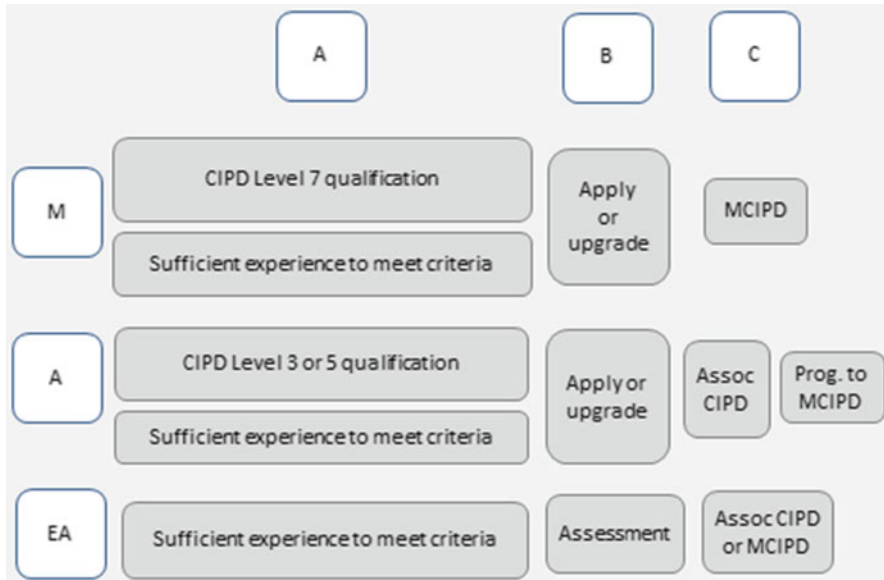


Diagram 7.4 Stages of production (human resource professionals). M=standard route to membership; A=standard route to associate membership; EA=experience assessment route; Assoc CIPD=associate member of the CIPD; MCIPD=Full member of the CIPD

CIPD has introduced an ‘academic’ route to membership, although this is still in its infancy with small numbers of members (138 out of over 134,000 in 2012) (CIPD 2012d, p. 17). Overall, pathways to professional membership of the CIPD lack the structure of the traditional ‘graduate’ routes offered by the RICS and also by ‘classical’ professions such as law and accountancy, and instead prioritise flexibility. This lack of structure may reflect the realities of human resource work and the experiences of HR practitioners.

Diagram 7.4 above differentiates between two stages that lead to accreditation as a full member or Associate of CIPD. Stage A relates to the process of undertaking a CIPD qualification and acquiring sufficient experience to meet the criteria of membership, although in the Experience Assessment route (EA) no specific qualification is required as such. At this stage we can see the potential influence of educational providers, although the CIPD retains control over the specification of qualification content rather than deferring to higher education institutions, and some have argued this has resulted in a ‘technicist’ or ‘de-politicised’ approach to human resource management evident in the suite of texts that the CIPD publishes (Gilmore and Williams 2007). This does not necessarily diminish the influence of higher education institutions, as they may choose to supplement CIPD content with additional elements in the context of an undergraduate or postgraduate programme, or critique the CIPD texts. However, it can be argued that the unilateral approach of the CIPD towards its qualifications reflects its own interests as a provider of training, and, more broadly, its own conception of the human resource profession. Stage B in the diagram consists of the application, upgrading or assessment process, which generally

involves input from colleagues and managers from the prospective member's workplace (CIPD 2012b; c). Here, therefore, the organisational context has particular influence.

7.8 Mutuality and Tensions in Production: The Two Professions Compared

Through the 'articulation' between the structure and stages of production (Felstead et al. 2009) relative levels of influence and the tensions of co-operation become apparent. The influence and role of those who contribute to the structure tends to alter at each stage. For example the graduate route membership of RICS generally involves a 'traditional' pathway consisting first of the initial predominance of degree-based education structured by partnerships between the RICS and the respective institution, before a second stage at which responsibility for formation is shared between the employer, RICS and the prospective surveyor. However, the professional experience route to full membership or the experience-based route to Associate membership rely to a greater extent on practitioner experience, which will have been influenced primarily by the work contexts in which he or she has been employed. Finally, the adaptation route, or the 'direct entry' Associate route rely primarily on the accreditation procedures of the processes of other professional bodies. Notwithstanding this, however, the RICS maintains its influence in all these routes through the Assessment of Professional Competence (APC), with its requirement for evidence of knowledge acquisition and application (RICS 2008b; 2011), in addition to the requirement for a sponsor who is a member of RICS.

In the case of CIPD, the soft infrastructure of social and technical relations is less apparent with an absence of stakeholder relations and partnerships in the process of formation. The stages of production are less dependent on co-operative relationships in the structure of production, enabling greater fluidity and flexibility. This is not to say that CIPD is not active in developing a form of infrastructure for their practitioner base, and in developing links with other organisations, but these do not necessarily impact on formation and appear to have a greater degree of contingency rather than necessity (Friedman and Miles 2002). The comparative absence of a professionally-mandated infrastructure guiding the articulation between stages and structure means that the individual practitioner and the various employment contexts they have experienced often have the greatest influence on formation. CIPD qualifications are increasingly flexible in terms of structure and delivery, and are often taken part time by those already in employment (CIPD 2012d). However, the introduction of the experience assessment route (EA) renders specific qualifications unnecessary for CIPD membership. In all routes to membership, the employment context has substantial influence on the process of formation and membership accreditation, as prospective members must have access to the opportunities to develop their capabilities and provide evidence of their competence. To qualify it is essential to be able to 'demonstrate how you make an impact in the workplace', and

to be able to complete statements that relate to workplace activities (CIPD 2011, pp. 3–7). In the process of upgrading to a new level of membership, two colleague feedback forms must be completed. The first must be completed by a line manager or client and the second by a colleague. However, unlike in the case of RICS, there is no need for these contributors to be CIPD members (CIPD 2011), and thus there is no necessary link to more experienced professionals in the process of formation. The weight attached to this process demonstrates the influence that the employing or contracting organisation has on the process of accreditation.

There is a contrast between a certain level of stringency in the professional formation of chartered surveyors and the relative flexibility of the formation and accreditation of human resource professionals. Indeed, whereas formation has traditionally been seen as an assumption of a shared identity and induction into a community of professionals (Friedson 2001), the acquisition of CIPD membership can potentially be an entirely atomistic individualised process, with minimal or no interaction with other professional members. Such atomisation is less likely to be the case with the surveying profession, due to the requirement to complete the Assessment of professional competence (APC), which entails some involvement with surveyors and probably cognate professionals, thus engendering contact with a network of practitioners.

The capacity to integrate employing organisations with professional formation strongly relates to the degree of flexibility in processes of professional formation. Whereas the RICS operates a mechanism, via its code of conduct (RICS 2012b) that ensures that employers are normatively obliged to support professional formation and ongoing professional development, this aspect of the infrastructure is very difficult for the CIPD to construct. Chartered surveyors, similarly to architects, many engineers, and lawyers, work predominantly within professional organisations that are able to sustain a logic of professionalism and patterns of work organisation that provide an infrastructure for formation within employment. What Billett (2006) describes as a ‘workplace curriculum’ may thus be readily apparent and easily accessible in the context of work, enabling organisations to support the structure of formation at limited cost. However, a guarantee of access to a workplace curriculum is more difficult to achieve with human resource management work, due to an absence of mechanisms through which employing organisations can be ‘tied in’ to the process of HR professional formation, leaving formation subject to the specific dispositions and proclivities of the employer.

7.9 Knowledge and Recontextualisation in the Productive System

The two productive systems discussed above can be further interpreted in terms of the different character of knowledge valued by the professions and how the processes of knowledge recontextualisation embedded in the infrastructure of the system support professional formation. A helpful notion is the knowledge ‘region’

(Bernstein 2000) which is formed through the appropriation and transformation (i.e. recontextualisation) of knowledge from 'singulars', or academic disciplines, 'to support a domain of professional practice' (Muller 2009, p. 213). Singulars and regions are examples of 'performance modes' which 'are based on different principles of text construction, different knowledge bases and on different social organisations' (Bernstein 2000, p. 51). Regions are therefore socio-epistemic entities that represent both the organising fora and the domain within which professional knowledge is validated for the purpose of recontextualisation into curricula and into professional standards. It can be argued that processes within the region are governed not only by the agency of the organisations, institutions and individuals that act within it, but also by the norms and socio-historical context of the profession, and by the structure and character of the knowledge contained in the region. The social dimension of the region thus loosely corresponds to the 'structure of production' (Felstead et al. 2009), while the epistemic dimension consists of the professional knowledge that forms the basis for curricula and recognition of competence. Regions are suspended between 'sacred' disciplinary singulars and the requirements of the 'profane' (Bernstein 2000, p. 52), which for most professions will include society, the market, other professions, and potentially government (Beck and Young 2005).

The notion of maintaining authority over a distinctive knowledge base is a fundamental tenet of most professions (Becher 1999; Beck and Young 2005; Friedson 2001), although this authority can rarely be translated into full 'control'. Professions are subject in some form to developments in knowledge, or its application, in related fields or disciplines (Foray and Hargreaves 2003). For example, medicine is subject to knowledge development in the pure sciences, while arguably chartered surveying is as much subject to developments in other cognate professions, including architecture, engineering and planning, as to breakthroughs in technology that impact on work processes. The dynamics within the region govern the way in which the influx of new knowledge is managed and incorporated into the professional knowledge base. This incorporation may involve 'profane' influences encouraging the prioritisation or reshaping of professional knowledge to suit the exigencies of the market or government, resulting in pressures for qualification reform. Alternatively, the 'profane' concerns with ensuring the sustainability of the professional body, or taking members from other bodies, may encourage actors within the region to recontextualise knowledge differently into curricula and professional standards, with the aim of making professional qualification more or less accessible or demanding. Regions can be seen as the space in which the 'hard applied' and 'soft applied' disciplines or fields of study (Becher 1994; Biglan 1973; Muller 2009) are located, and the variable levels of connectivity that these fields have with the 'hard pure' and 'soft pure' disciplines that form their parent singulars has a further impact on their character. Bernstein conceived the regions as formed from the recontextualisation of singulars (2000, p. 52), but this recontextualising process may or may not be continual, and may incorporate certain 'pure' singular elements to the exclusion of others.

Chartered surveying and human resource work demonstrate many of the qualities of 'hard applied' and 'soft applied' fields respectively. The region of surveying

knowledge has a need to retain relatively close links with other technically-orientated professional knowledge regions in order to maintain a relative level of authority over its professional knowledge in its construction and land specialisms. These regions will include in particular architecture, planning and engineering, which may be subject to pressures to manage constant inflows of new technical knowledge (Karseth and Nerland 2007). However, this connectivity can also entail difficulties with establishing and maintaining the boundaries of the surveying region, a factor that Beck and Young (2005) identify as contributing to weaker professional identities. The overlap of surveying competence with other professions, which have their own regions, means that knowledge is recontextualised both from other regions and from the surveying region's own parent disciplines. Where knowledge is recontextualised from another region this could lead to a 'dilution' in the conceptuality of knowledge (Hamilton 2012, p. 74). This is due to the more distant connection with developments in the academic disciplines from which knowledge is recontextualised into these regions. However, it is likely that many of the 'pure' academic disciplines relevant to surveying will be similar to those that contribute to the regions of architecture, planning and engineering. These disciplines incorporate primarily the physical sciences and 'harder' social sciences, such as geography and economics. The other more commercially orientated branches of surveyors may have greater interest in other business and management orientated regions that recontextualise knowledge from similar disciplines. However, in order to mitigate the 'dilution', the surveying region needs to maintain its capacity to recontextualise for its own purposes. Arguably, the surveying profession had recognised this with the development of partnership arrangements with surveying departments in higher education institutions with high quality research profiles (Plimmer 2003), although the argument above would suggest that it would be necessary to ensure that these departments have sufficient orientation towards disciplinary singulars and not only towards the specificities of practice.

For the non-technical human resource knowledge region it can be argued that there is less evidence for ongoing recontextualisation from what might be considered the 'soft pure' parent disciplines of sociology, psychology and economics. The human resource management disciplinary knowledge base is characterised by a porosity in its boundaries with other disciplines (Hamilton 2012, p. 77), and can be described as a 'weak' region that is subject to the dominance of knowledge from more powerful regions, such as management studies (Ibid., pp. 74–5). The region derives a greater volume of its knowledge from organisational contextualities than from disciplinary singulars, as practice-based knowledge is valued more than knowledge derived from disciplines (Hamilton 2012, pp. 63–73; Beck and Young 2005). The practice orientation can be demonstrated in the offer the CIPD makes to its members in terms of 'knowledge resources' and the mechanisms it uses to accredit its members, which concentrate on 'demonstrating workplace effectiveness'. The CIPD acts as a 'hub' of organisational and professional knowledge, encouraging its members' continual subscription through offering access to a dynamic knowledge base of 'best practice' which attempts to substitute for the disciplinary based knowledge that characterises traditional professions with 'stronger' classical regions

(Bernstein 2000, p. 55). The overall impression is of a profession that is largely disconnected from purer disciplines that might be accessed to support the profession in advancing knowledge and to illuminate challenges of practice. Becher (1999, pp. 179–196) outlines how many of the more technical professions maintain links with higher education departments to tackle difficult problems and to maintain the currency of their knowledge. These technical knowledge regions sustain links with purer disciplines, recontextualising knowledge in ways that is valuable for practice. Where co-operative relationships are less prevalent, as in the case of HRM, academics criticise practitioners for non-engagement with research, and practitioners criticise academics for irrelevant work (Short et al. 2009; Gray et al. 2011). The disengagement is compounded by notions of professional competence which are rooted in evidence of workplace ‘effectiveness’, which can be driven as much by local organisational knowledge and ‘behaviours’ as by the use of professional knowledge. The consequence is a professional knowledge base that adjusts to the whims of the market, with less capacity to access the abstract knowledge resources that would provide both greater professional legitimation and shed light on the challenges of practice. This also results in greater pressure on individual practitioners, in particular to ensure that their professional knowledge meets current workplace demands. The following section brings the resultant impact on practitioners into greater focus.

7.10 Professionals and Recontextualisation at Work

Evans et al. (2010, p. 246) use an interpretation of recontextualisation which differs somewhat from Bernstein’s (2000), incorporating ‘schools of thought, the traditions and norms of practice, the life experiences in which knowledge of different kinds is generated’ into the notion of context while retaining aspects of the focus on appropriation and transformation. This approach draws attention to the multiplicity of factors affecting the outcome for the practitioner, and incorporates both structural and agentic elements. In the model used by Evans et al. (2010) processes of recontextualisation are extended to workplaces and practitioners’ experiences, enabling an analysis of how knowledge is reconstituted as it flows from sites of production and curricula to work contexts, and, when brought together with an analysis of the productive system, an analysis of the extent to which this process is supported by educational institutions, employers and other professionals.

In the case of chartered surveying we can see how most pathways of formation (i.e. Graduate route via a RICS accredited degree and Professional Experience route as outlined in Diagram 7.2) support processes of workplace and learner recontextualisation. These routes provide opportunities for prospective practitioners to use workplace activities as a ‘test bench’ for curriculum knowledge (Evans et al. 2010, p. 247) through a period of structured training. Links are maintained, through curricula, with the original sites of knowledge production in disciplines and workplaces, via the partnership arrangements between RICS and higher education.

The workplace structured training that those on the graduate route to full membership of the RICS enjoy before completing the Assessment of Professional Competence also provides opportunities for a 'learning conversation' that 'recognises, but also expands employees'/learners knowledge and puts it to work' (Evans et al. 2010, p. 249), through the facilitation of the workplace supervisor. The structure provided by the Assessment of Professional Competence enables the developing expertise of the professional in formation to be valued, by the employer, the practitioner and also by the profession, and the co-operation of different actors with supportive roles provides an opportunity for the engendering of high trust relations both within and beyond the workplace (Fuller and Unwin 2010).

On the other hand, development of a version of the Graduate route to Chartered Surveyor status which obviates the need for structured training relies to a greater extent on the learner making sense of their own workplace experience through their own capacity to recontextualise, perhaps with fewer opportunities to 'test bench' knowledge from outside their experience. The Adaptation route to full membership of the surveying profession also lessens the influence of the professional body, and its partnerships with higher education institutions, over the recontextualisation process. In these cases there is greater reliance on processes of workplace and learner recontextualisation being supported by the context of surveying employment, which tends to involve contact and co-operation with other surveyors and cognate professions (Hannah et al. 2009). Thus the 'chains' of recontextualisation (Evans et al. 2010, p. 250) can be strengthened in cohesive networks of practice. However the existence of these networks requires the support of employers through an approach to workforce development that perceives breadth and depth of individual capability as vital for achieving objectives (Fuller and Unwin 2010). The existence of regulatory requirements linking individual surveying firms to the RICS, and rules of conduct that specify the importance of training and CPD should facilitate employer commitment to workforce development and the networks of practice necessary for recontextualisation processes to ensue (RICS 2012b).

In the case of human resource professionals seeking to qualify through the CIPD it is clear that the Experience Assessment route relies heavily on the recontextualisation capabilities of human resource practitioners, who will need to find their own way to 'make sense' of their own learning. It is undeniable that some very experienced practitioners may have the capacity to do this, including through involving critical friends, coaches and mentors inside or outside their workplaces. However, potential problems could be seen to exist due to the lack of structured links between curriculum, pedagogic and workplace recontextualisation where practitioners have not followed an initial CIPD qualification. The link with the sites of knowledge production in relevant disciplines and through research into practice is weaker, further evidence of the disconnect between human resource work and those disciplines that can potentially inform its practice. The formation of a successful human resource professional relies heavily on the existence of workplace opportunities and 'pedagogies of work' (Evans et al. 2010, p. 249; Billett 2002) that practitioners in formation may have limited control over due to the organisation of work (Felstead et al. 2009). The consequence is considerable pressure on the learner

to recontextualise knowledge individually, from a multiplicity of sources, and perhaps with limited guidance in distinguishing between what knowledge is likely to be useful based on rigorous research. It is here that the CIPD can be seen to have identified a gap which they can fill through the provision of member resources, packaging knowledge for the body of practitioners.

7.11 Concluding Remarks

The structure and stages of production of the two professions suggest that the models of professionalism in use differ. Chartered surveying ascribes to a technical and processual model of professionalism (Becher 1999) that has more in common with engineering and the other construction professions, while the CIPD appears to have taken human resource management in the direction of an organisational or corporate model of professionalism (Evetts 2011; Muzio et al. 2011), a step further towards the 'commercialised professionalism' (Hanlon 1998) identified by Gilmore and Williams (2007), and a pragmatic realisation of the role of a professional association in the contemporary context of HRM (Farndale and Brewster 2005). For Chartered Surveying the maintenance of the structures that underpin the professional knowledge 'region' remain important, and this is reinforced by the organisation of surveying work. In the case of human resource professionals the 'region' appears to have detached itself from the notion of a body of knowledge linked to 'pure' disciplinary 'singulars', and knowledge derived from practice that is deemed useful is prioritised. In effect the absence of disciplinary knowledge may lead to the development of a form of generic mode (Bernstein 2000, p. 53), 'directly linked to the instrumentalities of the market' (p. 55). In these circumstances professional bodies have opportunities to assert themselves, and it is clear that the CIPD has an ambitious agenda to develop knowledge resources that are then made available to CIPD subscribing members. The CIPD is filling the vacuum left in the 'region', but in so doing is in danger of defining valuable knowledge in terms of its current perceived applicability rather than its connection with ongoing research within purer disciplines that might inform human resource work.

The development of a wider suite of pathways to professional formation suggest that both professional bodies discussed here recognise the need to provide opportunities for members who may have worked in other fields, or entered the profession through employment based routes. However this expansion of routes could be seen to have stemmed from different impetuses, and have led to different results. The CIPD has streamlined and simplified the process of becoming a member, reduced the number of levels of membership and unilaterally governs its qualification base. It asserts that valid human resource knowledge can be gained through experience in any organisational environment. The result has been routes that offer greater flexibility to enable any prospective member to demonstrate his or her competence. In contrast the RICS recognises how surveying work both overlaps and interconnects with other cognate professions and with developments in the disciplinary knowledge

base. Thus the expansion of pathways and routes to qualification in surveying reflect attempts to secure the surveying profession through greater porosity and collaboration, with the acknowledgement than any attempts to strengthen the boundaries between surveying knowledge and other cognate knowledge bases, for example in architecture, planning or engineering, could result in loss of membership to other professions. However, although there are now more routes to membership, they remain tightly specified, reflecting the dense structure of production in which professional formation of surveyors is located.

Productive systems vary in terms of the extent to which an infrastructure of socio-technical relations is able to bind together the structure and stages of formation. As we have seen in the examples discussed the character of this infrastructure can be influenced by how professional work is organised, pressures to maintain jurisdiction, and by decisions made by professional associations which are constrained by the extent to which professions can form and reform institutions, and thus influence organisational fields to their own advantage (Greenwood et al. 2002; Scott 2008; Suddaby and Viale 2011). The key relations and characteristics within the infrastructure, including relations with higher education guided by conceptions of knowledge value, the capacity to integrate employing organisations, the degree of involvement of fellow professionals, and the tensions between specificity and flexibility in formation pathways, are all influenced by a dynamic interplay between the structural forces impacting on, and permeating through, the productive system, and the decisions made by agents acting within. The professional association, as we have seen here, has a key role in mediating, negotiating and steering the profession, facilitating change in the productive system within the constraints apparent within the wider professional, organisational and societal systems in which the profession is located.

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Part II

Research Paradigms

The diverse theoretical and conceptual accounts for understanding both professions and professional learning are this part's key focus. Its contributions indicate something of the scope of methodological approaches identified and adopted to investigate both the professions and professional learning. These approaches are represented by accounts of methods and paradigms which are used to engage in scientific enquiry associated with what constitutes professional work and its learning. For instance, in their chapter – *Understanding learning for the professions: How theories of learning explain coping with rapid change* (Chap. 8) – Erno Lehtinen, Kai Hakkarainen and Tuire Palonen review theories of learning to ascertain their accounting for the ways that the dynamic requirements for professional working life can be initially learnt and then addressed across lengthening professional lives. What they hold is that given the uncertainty about particular kinds of knowledge is necessary to identify which accounts of knowledge and learning furnish helpful advice about proceeding with supporting such development. Throughout, all of these accounts the mediation of knowledge for new generations of professionals was emphasized although how they account for, can tolerate and support the dynamic requirements of evolving professional practice is less clear. A helpful example of how to understand interactions and learning through practice and for professional learning is provided in the chapter by Laurent Filliettaz. Entitled *Understanding learning for work: Contributions from discourse and interaction analysis* (Chap. 9), this contribution highlights the importance of accounting for the discursive and interactional aspects of professional work and its learning. Necessarily interdisciplinary, this chapter illustrates how two distinct fields (i.e. linguistic method and educational research) offer complementarity and augmentation in addressing the specific and complex phenomenon of learning through work. Moreover, methodologically, this contribution illustrates the consonances between social theories of learning and approaches and procedures that are adopted within the fields of discourse and interactional analysis.

The centrality of method is foremost in the contribution from Paul Gibbs – *Research paradigms of practice, work and learning* (Chap. 10). From the field and

perspective of philosophy, this contribution argues for a multiplicity of methods and an emphasis on judgement rather than neutral objective premises of certainty in researching practice work and learning. It proposes that the messy research problems found within professional fields of practice warrant consideration within that context and needing to be grounded within explanations that can accommodate such indeterminacy and multiplicity. In making this case, he adopts critical realism as his foundation and premises this choice on its applicability to addressing issues that are relevant to practitioners, including its transdisciplinary reach. In their chapter – *A phenomenological perspective on researching work and learning* (Chap. 11) – Gloria Dall’Alba and Jörgen Sandberg similarly seek to account for the complexity of relations between work and learning. They hold that conventional approaches tend to separate individuals who are learning and the work to be learnt. Rather than accepting this separateness, they hold that the subject and the object are richly intertwined and, as a consequence, methods and procedures are required that can accommodate both perspectives and their interactions. In doing so, they elaborate a life world perspective on researching work and learning, which emphasises interdependence and relational perspectives as informing both work and learning.

From a distinct perspective, in his chapter – *The neuronal base of perceptual learning and skill acquisition* (Chap. 12) – Mark Greenlee examines the relationship between the organism and the environment. This chapter proposes that as interactions between persons and their environments progress across life histories, that a greater understanding of how the neural system mediates what is experienced and how responses arise is now warranted. Adopting views and conceptions from neuroscience, these are utilised to elaborate both perceptual learning and the process of skill acquisition. A review of concepts and contributions from this science provides a platform through which a case is made about understanding the immediate and longer term consequences of interactions with the environment as mediated through neural processes. These consequences include changes that arise in nervous system as a result of encountering particular kinds and configurations of stimulus. In conclusion, considerations are given, to the qualities of particular learning environments.

In another specific approach, Eva Kyndt and Patrick Onghena in their chapter – *Hierarchical linear models for research on professional learning: Relevance and implications* (Chap. 13) – propose that it is important for quantitative analysis to be applied to the field of professional learning because much of the conceptions, theorisations and literature emphasises qualitative method. In essence, the chapter provides an overview of these models, their applicability to the field and key premises through which they utility can be understood. They seek to make explicit the ways that hierarchical linear modelling can lead to significant contributions to the field of professional learning. The authors then exercise and exemplified this claim through engaging with the body of literature about employees’ intentionality as directed towards their learning. In doing so, they rehearse and extend many of the key premises associated with quantitative method and its broad applicability to this field. Catherine Hasse, conversely, in her chapter – *The anthropological paradigm of practice-based learning* (Chap. 14) – makes the case for anthropological research to

be used more fully and comprehensively in enquiries associated with work and learning. Again, this chapter sets out much of the method adopted within this paradigm and introduces foundational studies and more recent contributions in elaborating its utility. In doing so, she offers the reader an account of the origins of anthropological method and its development over time. She includes examples from broadly related fields of the development of culturally important knowledge and practices and then makes the links to the application of these foundations to understanding professionals' learning and work. In doing so, she also engages with current debates within and contributions from anthropology that have direct relevance to professional learning.

Although by no means exhaustive, these contributions represent some of the methods and paradigms that can be used in the field of professional work and its learning. As such, key and contrasting methods are included, illustrated and discussed in this part.

Chapter 8

Understanding Learning for the Professions: How Theories of Learning Explain Coping with Rapid Change

Erno Lehtinen, Kai Hakkarainen, and Tuire Palonen

Abstract Working life is increasingly in turbulence. Whole traditional professional fields disappear as new ones emerge. Within traditional professions technological and organisational development often means rapid changes in knowledge, skills, and working attitudes required from workers. All of this results in a challenge to develop vocational and professional education, and models of workplace learning that respond to these changes. The central questions are how new generations should be prepared for a future, at least partly unknown, working lives and how old workers should be supported in the necessary updating of their knowledge and skills during their work careers are added challenges. The aim of this chapter is to analyse how adequate the contemporary theories of learning are for dealing with these challenges.

Keywords Change • Learning theories • Soft skills • Transfer • Expertise • Knowledge acquisition • Participation • Sociocultural learning • Conceptual change • Knowledge transformation • Activity theory • Deliberate practice • Cognitive theory

8.1 Introduction

Working life is increasingly in turbulence. Whole traditional professional fields disappear as new ones emerge. Within traditional professions technological and organisational development often means rapid changes in knowledge, skills, and working attitudes required from workers. All of this results in a challenge to develop

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vocational and professional education, and models of workplace learning that respond to these changes. The central questions are how new generations should be prepared for a future, at least partly unknown, working lives and how old workers should be supported in the necessary updating of their knowledge and skills during their work careers are added challenges. The aim of this chapter is to analyse how adequate the contemporary theories of learning are for dealing with these challenges.

Certainly, a great deal of the changes requiring gradual or more radical reconsidering of professional practices and competences, takes place within existing professions. New technologies, increasingly complex production methods, marketing and distribution networks, internationalization and globalization change not only influence the work of those professionals in higher positions within work hierarchies, but have an influence throughout the work organizations (Harkin 2004). Moreover, Globalization, changes in communication technologies, and unexpected consequences of previous and contemporary technologies result in deep reaching changes in society and modify our daily lives. Increasing market competition and companies' attempts to profit from rapidly changing products and reduced production costs also lead to pressures towards innovation and the restructuring of organizations. Many researchers have analysed conditions and processes that cause such radical changes in working life and which result in the emergence of new professional fields (e.g., Talwar and Hancock 2010; Redecker et al. 2010; Davies et al. 2011). Studies such as these have identified several 'change drivers' that require co-ordinated, often global solutions, e.g., in the fields of environment, finance and security.

Indeed, various threats and possibilities, demographic change, economic turbulence, political change, norms, and legislation have resulted in the creation of totally new jobs, or hybridized existing jobs in complex ways. Hybrids, such as personal debt advisors, game addiction therapists or energy efficiency experts can all be institutionalized as a subfield of existing disciplines, or a permanent cross-disciplinary program, or they can remain informal (Klein 2010). Talwar and Hancock (2010) analysed how new jobs arise as a consequence of opportunities and implications for science and technology, which lead them to present quite exotic examples of future professions (e.g., body part maker, nano-medic, farmer of genetically engineered crops and livestock, social 'networking' analyst). In general, these new jobs seem to emerge at the edge of and in between various professional domains (Palonen et al., 2014). Multi-scientific and multi-disciplinary domains such as sustainability science have arisen to address the impacts of climate change and redress other sustainability challenges. These are sometimes attempts to bridge the natural and social sciences in responding to these complex challenges (Jerneck et al. 2011). Some of the changes to existing professions and the creation of new professional fields augment and build on previous fields of expertise and only require gradual enrichment of previous knowledge and accepted competences. However, in many cases new emerging professions or deeply changed work requirements in existing professions cannot be dealt with using monotonic learning – based on existing knowledge, skills and practices – but require non-monotonic learning – creating a radically new knowledge base and professional practice (Ohlsson 2011).

The orthodox way to consider education, vocational training and expertise development assumes that there is a known societal context, working life or professional practice for which learning in educational programmes should prepare students. Analogously, learning in workplaces is deeply embedded in the existing structures and practices of workplaces or relatively well known intentional plans and arrangements to change or develop some of the practices in those workplaces. The very nature of general education and institutionally-based vocational education is to transmit established knowledge and culturally-formed practices to new generations (Pring 2004). Historically, the dominating model of vocational training is based on apprenticeship in workplaces, and this continues to be the practice in many countries. However, vocational training in special institutions dominates training for occupations on higher levels of the occupational hierarchy (Powell and Solga 2008). Also, with vocational and professional learning taking place in educational institutions, there are also often practical training experiences provided in work environments and which are now considered as fundamental elements of initial occupational preparation. The role of these workplace experiences is to provide students with experiences that familiarize them with authentic work practices and experiences of working life. All this is aimed at transmitting existing knowledge, skills and practices to new generations of workers. These orthodox conceptions of schooling and training might work relatively well in preparing newcomers to professions where changes are slow and incremental and the occupational requirements have remained relatively stable. That is, without deep reaching qualitative changes.

In these circumstances, the content of the curriculum is based on a consensus among societally recognized domain experts about the competences needed in particular fields (Billett 2003). In the best cases, the content of vocational and professional education programs, particularly when connected with well-organized practice in workplaces, provide novice workers with sound bases for their professional careers in the assumption that no radical changes in the nature of the work are likely to occur. However, outside of such circumstances, the limited capabilities of educational institutions and traditional teaching methods to adequately prepare new generations for the challenges and potentiality of a rapidly changing working life in the future are widely recognized. A frequently enacted response to this challenge is to provide students with what are referred to as transferable ‘soft skills’ – the kinds of capacities associated with communicativity and adaptability (Fallows and Steven 2000). Globalisation, information and communication technologies and new forms of organisations as well as rapid change of professions and work practices have changed the way work competences are defined. It has particularly resulted in a strong emphasis on soft skills as the key issues which explain employability and productivity in contemporary and future work. Large international projects have focused in defining the future competences and particularly the soft or generic skills needed in the future (Markes 2006).

Although soft skills may be useful in a variety of work situations and occupational practices, they are not a sufficient solution for helping new generations or older workers to cope with the more radical qualitative changes in work. For instance, an ability to apply disciplinary knowledge (e.g. mathematics) and work specific

skills in meaningful ways is held to be fundamental for successful work processes (Stasz and Brewer 1999). The requirements for coping with rapid and unexpected changes is not what kinds of soft skills workers have, but how they are able to restructure their basic disciplinary knowledge and work-specific skills in adaptive ways to respond to these changes. Based on his analysis of the nature of changes in a turbulent world, Ohlsson (2011) concluded that coping with radical changes requires non-monotonous learning which is not constrained by the experience that are similar to what has traditionally been described as learning. Instead, he defines this approach called “Deep Learning” as follows:

In the course of shifting the basis for action from innate structures to acquired knowledge and skills, human beings evolved cognitive processes and mechanisms that enable them to suppress their experience and over-ride its imperative for action. (Ohlsson 2011, p. 21)

The key premise in this definition is that in the history of humankind there have always been groups or individuals who have been able to surpass the immediate experience in their acting and thinking, resulting in novel ways of interpreting the world and these stand as powerful tools for overcoming the constraints of human’s biologically-determined limitations. With the term monotonic learning Ohlsson (2011) refers to additive cognitive growth of knowledge, which is consistent with what is known before. In an analogous way, two decades ago Hatano and his collaborators (Hatano and Inagaki 1986) introduced the term Adaptive Expertise, which approaches the same questions as Ohlsson’s definition of Deep Learning from a somewhat different perspective. Adaptive Expertise is an integrating concept that consists of cognitive, motivational, and personality-related aspects of orientation to approaching novel tasks and challenges. Problem-solvers generally demonstrate adaptive expertise when they are able to efficiently solve previously encountered tasks and generate new procedures for new tasks (See also the flexibility concept of Feltovich et al. 1997). Here it is proposed that, respectively, Ohlsson and Hatano conceptions of Deep Learning and Adaptive Expertise are needed for coping with radical changes taking place in working life. However, it is far from easy to describe what Deep Learning or Adaptive Expertise means in concrete terms and applicable terms. Thus, it is important to analyse if contemporary theories of learning can adequately describe the processes through which individuals and collectives secure or fail to learn the knowledge needed in radically changing circumstances.

8.2 A Systemic Approach to Theories of Learning

Since the nineteenth century there have been serious attempts to study learning by using scientific methods. This long tradition has resulted in a large number of theories, some of which have become widely accepted in the research and educational communities. However, it is clear that there is no one theory, which explains learning (Lehtinen 2012). The most obvious reason for this is that situation is that there is no consensus on a theory of learning because learning is not a specific phenomenon but

a kind of metaphoric concept. Moreover, it is a term used in everyday language and scientific literature to refer to very different processes from simple behavioural change in animals to learning abstract mathematics in the university, or learning as organisational change in enterprises (Lehtinen 2012; Säljö 2009). It has been common for the theoretical developments in learning research that when new approaches have been developed there have been intensive, critical and often unfruitful discussions between the advocates of the “old” and the “new” theories. During the last few years, there have been several attempts to analyse the diverse and complex field of theories and approaches of learning research from a meta-theoretical point of view (Lehtinen 2012). In her widely cited article, Sfard (1998) argued that certain kinds of metaphors underline the development of all theoretical thinking and proposed that it is possible to organize the field of learning research by classifying the dominating approaches into two loose categories, characterized as acquisition and participation metaphors of learning. Acquisition and participation metaphors are ontologically different ways to define what we mean with learning.

Sfard’s metaphor idea was later elaborated and extended further by Paavola et al. (2004), who proposed a third metaphor that they called the knowledge creation metaphor. None of these models construes the different metaphors as mutually exclusive. Indeed, learning is a complex phenomenon and different theoretical approaches are needed in analysing it in different situations (Lehtinen 2012). A very different approach was used by Alexander et al. (2009) who proposed a model that they called a topographical framework of approaches and theories of learning. They identified a set of principles that are common for most of the known theoretical approaches to learning (Alexander et al. 2009, p. 178). When commenting on the article of Alexander et al. (2009), Säljö (2009) highlighted that the model of Alexander et al. did not take into account the differences in the units of analysis of different approaches and the ontological and epistemological suppositions related to the use of these units in research.

Here, our aim is not to choose a theoretical camp or propose any “unified” theory. Instead, we propose a complex system view for dealing with the different theoretical approaches. The main theoretical approaches are typically attempts to answer different questions and they focus on different units of analyses (Lehtinen 2012; Säljö 2009). According to idea of complex systems, these approaches represent different systemic levels, which are mutually dependent, but not reducible to each other (Lehtinen 2012; Ohlsson 2011). In human learning, there are several system levels which all have their own characteristic properties that extend from primary concerns on neural processes through to cultural activity systems. As parts of a complex system, the properties of one level are interacting with properties of the other levels.

The complex system approach indicates that it is important to study the characteristic properties of different systemic levels and the interactions between them (Ohlsson 2011). A further assumption here is that cultural or situated activities and mental cognitive processes are two distinct, but interrelated levels of the learning system and both are particularly relevant when our aim is to understand how individuals or larger social communities are able to cope with rapid change. This coping

requires developing new knowledge and skills that go beyond previous experience and monotonic enrichment of prior knowledge and practices. In this chapter, the principal focus is on individual level cognitive processes. But, before reviewing the cognitive literature, we will briefly discuss how socio-cultural theories are dealing with the challenges of a turbulent world.

8.3 Do Theories of Learning Give Tools for Preparing People for a Turbulent World?

In his recent book “Deep Learning” Stellan Ohlsson (2011) argues that the seventeenth century scientific revolution in the natural sciences led to successful findings about the regular and predictive nature of many physical phenomena. In line with these findings, highlighting the regularity of physical world through a clockwork system became a general metaphor for science and it has dominated scientific thinking for centuries. Recently, alternative theoretical traditions have developed in natural sciences, which deal with chaos, complex systems and emerging processes. The focus is in phenomena and processes that do not follow clockwork type regularities (Ohlsson 2011). However, most of the existing approaches or theories of learning describe learning, which follows a clockwork-like model where learning is described as acquiring representations of known regularities and causal relations. This type of learning can also be characterized as monotonic additive change acquiring of knowledge or practices. However, in a turbulent world, it is becoming more and more important to ask how theories of learning help us understand flexible and adaptive forms of learning. In particular, it assists understand how non-monotonic learning that creates new knowledge and skills thereby enabling people to cope with emerging and surprising phenomena in their environment (Ohlsson 2011). In what follows, we review how sociocultural theories and theories describing individual level cognitive and constructive processes deal with the challenge of rapid and radical change.

8.3.1 Sociocultural Theories and the Challenge of Change

Most dominant ways of conceptualizing learning in sociocultural and situated theories emphasize a conservative rather than a radically changing or creative nature of learning. The Vygotskian (1978) idea of the zone of proximal development describes learning as a process in which new knowledge or skills first appear on the social level in interactions with a more knowledgeable collaborator (e.g. parent, teacher or experienced professional) and are afterwards internalized by the individual. In the seminal contemporary descriptions of situated learning theories, such as legitimate peripheral participation within a community of practice, the conservative

nature of learning is even more obvious (Lave and Wenger 1991). The relevant knowledge and skills already exist in the communities and newcomers become competent members of the community through the process of a gradually deepening participation.

However, more general level sociocultural approaches include a strong idea of qualitative change in the course of history. One of the approaches is Donald's (2000) theoretical description of how culture literally *reformats and re-programs the human cognitive architecture*. As a consequence of extensive cultural re-shaping, cultural resources became internalized as a part of human cognitive architecture and drastically affect the available cognitive resources on many levels. Because human cognitive capacities are not only biologically given, but also culturally-mediated, biologically equivalent brains adapt by sustained cultivation of expertise to prehistoric hunter-gatherer culture, the concurrent knowledge-intensive society, and to whatever will emerge in the future. Expertise in this way can be seen as a cultural-historically evolving interface between humans and the cultural environment of their activity. It represents a set of culturally programmed capacities that allow human beings utilize their cultural-historically accumulated knowledge and know-how and to go beyond biological limitations of intellectual achievement. There are a few more concrete theories that aim at describing how the creation of new knowledge could take place in social-cultural context.

8.3.1.1 From Tacit to Explicit Cycle as Innovation Creation Process

Within the sociocultural tradition there are many attempts to describe processes that not only mediate existing knowledge and practices, but also create new practices and innovations. Nonaka's model of knowledge transformation and innovation has been largely cited as a model of how new conceptual knowledge and practices emerge in an organisational context. According to Nonaka and Takeuchi (1995), western ways of thinking have been too concentrated on explicit knowledge. Explicit knowledge means all that knowledge which is easy to articulate and express formally and in clear terms. But in innovation, tacit knowledge is much more important. Tacit knowledge means personal and subjective knowledge that is embedded in individual experience and action; it involves personal intuition, ideas, and values. Due to its very nature, tacit knowledge is difficult to communicate to others. It especially addresses the dynamics of knowledge creation. In their model, knowledge creation is based on the interaction between tacit knowledge and explicit knowledge. Nonaka and Takeuchi (1995) also proposed that such creation involves passing through several "ontological" levels, i.e. individual, group, organizational, and inter-organizational levels, in order to be effective for all people and for whole organizations. The basic question in innovation is how this personal know-how and experience can be transformed so as to be useful for the whole group, and, conversely, how explicit knowledge in the group can be transformed into personal know-how and experience.

Nonaka and Takeuchi's solution is based on four "modes" of knowledge conversion. Knowledge can be transformed: (a) from tacit knowledge to tacit knowledge (a phase which is called socialization); (b) from tacit to explicit knowledge (externalization); (c) from explicit to explicit knowledge (combination); and (d) from explicit to tacit knowledge (internalization). These are four phases of the "knowledge creation" spiral, which commence when tacit knowledge and experiences are socially-shared at the group level. The idea is that the conversion involved in the knowledge spiral is a social process *between* people rather than one that takes place *within* people. In these processes analogies and metaphors are used to articulate ideas for innovation (Hakkarainen et al. 2004b).

8.3.1.2 Activity Theory and Expansive Learning

Engeström (1999) shares the same aim of describing the collective process of innovation creations with Nonaka and Takeuchi's (1995) but he criticizes their theory for not taking into account the key aspects of the innovative learning process. He has studied innovative learning cycles in work teams using cultural-historical activity theory and the theory of expansive learning as a framework for his analysis (see Engeström 1987). His main critique of Nonaka and Takeuchi's (1995) model is that it does not take into account those phases of knowledge creation where problems are formulated and analysed in the first place. According to Engeström, innovative learning starts by criticizing, questioning, and analysing existing practices. A particular aspect of Engeström's theory is in its focus on dialectical tensions, contradictions, and conflicts within communal activities; these are usually ignored (and considered nuisances) by other approaches focusing on immediate empirical generalizations. As an alternative to Nonaka and Takeuchi's model, Engeström (1999, pp. 383–384) has provided his own model of an expansive learning cycle. It starts by (1) individual subjects *questioning* and criticizing some accepted practices, which is followed by (2) *analysis* of the situation, i.e. analysis of those (historical) causes that have led to the situation in question, followed by (3), *modelling* of a new solution to the problems, and (4) *examining* the new model by experimenting and seeing how it works, and what potentialities as well as limitations it has. Next is (5) *implementing* the new model in practical action and applications, and (6) *reflecting* on and evaluating the process. Finally there is (7), *consolidating* a new form of practice. Different phases do not necessarily take place in a fixed sequence but Engeström emphasizes the flexible nature of the process in contrast to the mechanical order of the Nonaka and Takeuchi model.

However, despite their claims, both models have been successfully used in describing processes of change and innovation creation in organizations. The examples of the new innovations, boundary crossing processes and organizational changes described in the case studies of Nonaka's and Engeström's research groups are, however, closer to the monotonic extensions of existing knowledge than to non-monotonic creation of radically different ways to understand the world (Ohlsson 2011).

8.3.1.3 Knowledge-Creating Metaphor of Learning

A more ambitious attempt to theoretically describe how building fundamentally new knowledge occurs in collaborative processes has been presented by Hakkarainen and his collaborators (Hakkarainen et al. 2004a, Paavola and Hakkarainen 2005). Hakkarainen and his colleagues have proposed that professional learning in an advanced knowledge society can neither be reduced to the assimilation of already existing information (as assumed by the knowledge acquisition metaphor) nor growing up within prevailing community practices (as is often assumed by the participation metaphor). They propose a third, knowledge-creating metaphor of learning (Paavola et al. 2004) according to which learning may be seen as a process of deliberately creating new knowledge or transforming social practices in an interaction between individuals and communities. This process is driven by a central characteristic of adaptive experts' activity. That is the systematic working at the edge of competence, pursuing novelty and innovation. Their approach examines learning (a) in terms of building and extending shared knowledge artefacts, such as ideas, theories, or products, (b) creating collectively shared knowledge practices (making pursuit of innovation and novelty a social practice), and (c) interaction between personal and collaborative knowledge-creating efforts (transactive development of expertise).

Knowledge creation, in this way, may be seen as a collaborative process of working with a shared object and growing through the process. To solve complex and partially unforeseen problems at the edge of their competence, knowledge workers have to create, extend, and build shared knowledge artefacts (Bereiter 2002), such as texts, graphs and models, that crystallize their evolving knowledge and understanding. Pursuit of such artefacts is critical in knowledge creation because they can be endlessly re-interpreted and their evolving network used as a starting point of articulating and iteratively improving novel epistemic artefacts (Bereiter 2002; Paavola and Hakkarainen 2005; Skagestad 1993). As claimed by Knorr-Cetina (2001), creative knowledge work focuses on incomplete epistemic objects, objects that are open-ended and constantly generating novel questions and becoming more and more complex when pursued. Knorr-Cetina (1999) also pointed out that epistemic objects involve "pointers" (e.g. hints, guidelines, directions) regarding how further activities should be focused. These objects imply what is missing from the picture, and, thereby, guide further inquiries. Consequently, the epistemic objects created provide intuitive support, suggesting which way to look. Epistemic artefacts generated by knowledge communities' participants also appear to function as boundary objects (Star 1989) that assist multiple communities in carrying out coordinated inquiries, cross-fertilizing their knowledge, and hybridizing expertise across two or more domains of knowledge (Howells 1999). Knowledge-creating processes involve deliberate efforts in spanning boundaries of prevailing knowledge by creating novel and often far-reaching networking linkages to experts, communities, and networks representing heterogeneous knowledge and competence. The participants appear to co-evolve with the growing network of epistemic artifacts created in the course of their activity.

Hakkarainen and his colleagues (2011) argue, further, that professional creativity needed for encountering novel and unanticipated challenges does not only

lie within the human mind but is embedded in shared knowledge practices cultivated by such knowledge communities. They use the term “knowledge” in the broadest sense, to include what is explicit or stated in official discourse (e.g., approved texts), to what is implicit, informing one’s habits (perhaps pre-reflectively) of expert working; and further still to that which underlies the competencies of experts, for example, so called “procedural knowledge.” They argue that concurrent expert communities rely on “weakly determined, unstable, explorative, and problem-laden practices that are once in a while innovative” (Knorr-Cetina 2001). Knowledge practices, while sometimes just supporting routine learning (transmission), at their creative edge diverge from other routine social practices in that they take place in specific purposefully dynamic and fluid settings designed for the furtherance of innovation and knowledge (Knorr-Cetina 1999, 2001). Rather than merely relying on mundane habits or repeated routines (that may also be needed), such practices are aimed at solving emergent problems and constantly pursuing novelty and innovation. Professional experts have to increasingly meet novel challenges and engage in systematic creative reinvention of their shared practices so as to elicit novelty and innovation (Knorr-Cetina 1999, 2001). It is held that in the case of communities that follow such practices, innovation and the pursuit of novelty are themselves transformed to shared social practices through the cultivation of corresponding personal and collective competencies and patterns of shared activity (Knorr-Cetina 1999, 2001; Simon 2002). Whenever such innovative practices are encountered, we are dealing with *innovative knowledge communities* and their networks (Hakkarainen et al. 2004a).

Hence, the subject of knowledge creation is a collective rather than an individual. While individual experts often have a critical role in the pursuit of novelty and innovation, it takes place on a fertile ground provided by collaborative activity (Paavola et al. 2004). In parallel with social communities, adaptive experts may appropriate innovative knowledge practices to the extent that the pursuit of transformations relevant for knowledge-creation becomes their second nature, i.e., an integral aspect of their activity. There appears to be a dynamic and fluid reciprocally effective interaction between personal and collective practices that drives the development of collective activity. The development of expertise is a long-standing process involving profound personal transformations. Such a process cannot be understood by examining mere personal drives for developing expertise or stable features of the social and cultural environments but rather the dynamic “transactional” interaction between these two poles of development (Sameroff and Mackenzie 2003).

A sustained pursuit of deliberate practice enhances and augments the participants’ cognitive capabilities for adapting to the environment of their activity and allows them to address problems at higher and more complex levels. By systematically building their personal learning networks that reach beyond the boundaries of their immediate community, participants are transforming the ecology of their development. In order to orient towards constantly working at the edge of competence, experts have to develop dynamically evolving and gradually tightening criteria of assessing and evaluating their performance. Bereiter and Scardamalia (1993) distinguished between first- and second-order environments. First-order environments are

static in nature, and adaptation in these environments is oriented toward meeting a fixed set of conditions. In second-order environments, on the contrary, the conditions to which an agent must adapt change dynamically as a function of the other actors' (individuals or organizations) progress in the environment. High-tech companies or scientific research communities represent such second-order environments with progressively changing requirements. Exceptional competencies emerge collaboratively in *second-order cultures* in which the environment of adaptation transforms and the acceptable level of performance is dynamically growing as a function of other communities' success. This framework is compatible with an idea that individual, community, and larger knowledge networks constitute different systemic levels that are reciprocally dependent on one another.

8.3.2 How Individual (Mental) Level Theories Are Able to Explain Radical Change?

Following the approach that views theories of learning as conceptual tools for dealing with phenomena (i.e. units of analysis) on different levels of a complex system, we now focus on theories describing individual level cognitive processes. This approach reveals that individual cognitive processes are not independent of culturally and socially shared knowledge and practices. Worthwhile creative insights do not emerge accidentally or randomly. Creativity, intuition, and innovation are not based on spontaneous, unique, and in accessible subjective processes (Ohlsson 2011; Simon 1977). Even if new ideas may arise as sudden insights, these ideas are often held to be preceded by relatively long periods of collective work dealing with the problems under investigation (Csikszentmihalyi and Sawyer 1995; Gruber 1981, 1995).

A fundamental feature of generally accepted models of human cognitive and constructive processes is that situations and new information are interpreted within the frames of already existing mental representations. A consequence of that interpretation is the conservative nature of cognitive processes. How is qualitatively new knowledge possible if perception and thinking is based on already existing knowledge? Based on formal logic some philosophers (Gödel 1962; Fodor 1976) have concluded that a symbol system or a system of axioms can only generate sub-systems, which are not more powerful than the original system. When applied to learning and knowledge construction this means that there is a learning paradox, which questions the possibility of constructing fundamentally new knowledge (Ohlsson 2011).

However, it is clear that people are somehow able to break out of the initial frameworks and create radically new ways of thinking and acting (Ohlsson 2011). Many approaches in the cognitive tradition have focused on explaining change in knowledge and skills. The question of how the human mind is capable of going beyond its existing skills and experiences is not new. This type of learning and problem solving was clearly the aim for the psychological tradition, which was labelled gestalt psychology (Wertheimer 1959). Innovative studies about problem solving and insight carried out by the gestalt psychologists in the first half of

twentieth century are still topical, but this tradition failed to present a solid theory because it didn't have an established "language" for describing mental processes (Langley and Jones 1988; Ohlsson 2011; Simonton 2000). Piaget's accommodation concept and particularly the idea reflective abstraction and the characteristics of formal operation level thinking are attempts at describing how the human mind develops new forms of thinking, which make a higher level interpretation of world possible (Piaget 1976, 1978). However, the aim of Piaget's theoretical work was to explain general (epistemological) transitions between forms of thinking in the course of human development, from infancy to adolescence, and it is questionable how well these theoretical models can be used to describe the nature of learning concrete tasks.

8.3.2.1 Reconsidering the Concept of Transfer: From Immediate Transfer Towards Preparation for Future Learning

The issue of transfer is normally discussed in the context of education. However, it is even more important in the development of generalized knowledge and skills, including varying attempts to apply prior knowledge in different transitions from school to work, or from one working place to another. Firstly, it raises the question of the existence and role of abstract knowledge. Secondly, it highlights the role of people's own activity and agency in these transitions. Thirdly, it questions the immediate and correct application of previous knowledge as the main criterion for transfer.

According to De Corte (1999), the problem of transfer and general applicability of knowledge and skills has been on the agenda of research in educational psychology and learning research throughout the previous century, and the interest in the issue has increased during last 10–15 years. In their review article on transfer, Bransford and Schwartz (1999) emphasize the importance of transfer for the very idea of schooling. A belief in positive effects that extends beyond the exact conditions of initial learning underlie the very rationale of educational institutions and teaching activities. Educators are hopeful that students will show evidence of (positive) transfer in various situations. As far as vocational education and professional training is concerned the success depends on students' ability make use of their school learning in future work. However, the issue of transfer is very controversial and it has been the subject of many critical debates among researchers (see Anderson et al. 1996; De Corte 1999, 2003; Detterman 1993; Lave 1988; Ohlsson and Lehtinen 1997). The critical discussion is partly based on experimental empirical findings, often showing failures of transfer (e.g. Detterman 1993), and on theoretical analyses emphasizing the situated nature of activity and cognition, which call the whole meaning of transfer into question (e.g. Lave 1988).

In their frequently cited analysis of types of transfer, Salomon and Perkins (1989) distinguished between a 'low' and a 'high road' to transfer. The 'low road' transfer takes place when conditions in the transfer context are sufficiently similar to those in a prior context of learning. These can more or less automatically trigger responses similar to the learned processes in the initial situation. This type of transfer can be

explained in Thorndike's traditional terms of identical elements between initial and target situations or tasks. Singley and Anderson (1989) have reinterpreted Thorndike's behaviouristic view into cognitive language within the frames of their ACT* theory, and defined transfer in terms of identical cognitive productions. The traditional Thorndikean view and its modern cognitivist version highlight the objective similarity of the situations, and they pay less attention to the subjective interpretations of the learners. From the point of view of understanding learning radically new ways to understand situations the traditional transfer concept doesn't provide very much because it refers to a simple repetition of previously learned knowledge or at the most gradual monotonic change.

Institutional vocational education and formal professional training are based on the assumption that knowledge and skills learned in these situations are widely applicable to diverse situations. However, the dominant traditions of learning and expertise research have emphasized more restricted possibilities of transfer. Theories of development of expertise (e.g. Ericsson et al. 1993; Lave 1988; Lave and Wenger 1991) and laboratory experiments on transfer (e.g. Detterman and Sternberg 1993) all seem to concur that activity in a particular situation depends on knowledge and skills that are situation specific and highly particular (Billett 2001). The ability to perform a given task resides primarily in how much one knows about that particular task in a certain context, not in general principles or in any capacity for abstract thinking (Lenat and Feigenbaum 1991).

Many current ideas emphasize the use of concrete, episodic and socio-culturally embedded information without the involvement of general principles and abstract knowledge that have traditionally been connected to higher-order thinking. Lave's (1988) widely cited descriptions of the use of situated strategies instead of formal school mathematics in grocery shopping or preparing meals at home have been used as a proof that "abstract" school mathematics does not transfer to practical situations. However, the examples could also be explained differently. They all include several aspects of formal mathematical knowledge, which are used as a part of the situational strategies to solve the particular problems. From this point of view, the examples describe creative ways of transferring abstract mathematical knowledge to concrete situations and embed them in activities and tools available in these situations. Recent findings of the use of mathematical knowledge in different professions refer to this kind of interpretation. Formal mathematical concepts and procedures are very important in a range of professions, but these are applied very differently depending on the requirements of the particular tasks. Mathematical knowledge (i.e. that typically learned in general education) is used in relation to a particular work process or technological application. In boundary crossing communication between different professionals formal mathematical and scientific concept serve as a commonly shared basis, helping to avoid misunderstandings (Stasz and Brewer 1999).

Greeno and his collaborators (Greeno et al. 1993) have proposed an approach, which deals with the similarity of the situations from the point of view of the learner's activity in them. The activity in the learning situation occurs under certain affordances and constraints. Transfer is possible, if the new situation contains sufficiently similar constraints and affordances to the initial context, or if the learner interprets

them similarly. This view also highlights the similarity of the situations but not so much as an objective condition than as a set of features of the situation interpreted from the point of view of the learner's intentional activity. However, the critical question here is that what happens when no immediate similarity can be perceived.

There are theoretical approaches to transfer, which can be used to analyse situations in which there is no immediate similarity. The second road to transfer in the model of Salomon and Perkins (1989), namely the "high road" describes these kinds of situations. They argue that there is also a higher level of transfer, which depends on abstraction from the context of learning or application and a more or less conscious attempt to find general patterns and principles that go beyond the surface features of the situations. This type of transfer is not immediate but demands time for exploration and mental effort. It is not the similarity in any superficial feature of the initial and target problems or situations that characterize transfer but the thinking and knowledge which is transferred to new situation can be on a very high level of abstraction. Bransford and Schwartz (1999) argue very similarly that effective transfer requires a sufficient degree of original learning, which leads to relevant abstractions. For Bransford and Schwartz (1999), meaningful transfer is not only the immediate application of previously learned knowledge in new situations, but they broaden the conception of transfer by emphasizing that transfer should be conceptualized in terms of "preparation for future learning". Here, the focus shifts to the assessment of individuals' abilities to learn according to the future demands and opportunities arising in new situations. In addition, they point out that an important aspect of active transfer involves people's willingness to deal with novel and challenging tasks in social interaction situations and to understand others' ideas and perspectives. Bransford and Schwartz (1999) exemplify the preparation for future learning approach to transfer by describing teachers' transition from teacher education to work.

As an illustration of transfer as PFL, imagine elementary education majors who graduate and become classroom teachers for the first time. By the standard DA (Direct Application theory of transfer) definition of transfer, the test of transfer would be whether the beginning teachers, without coaching, can apply to the classroom the methods they learned in school. As noted above, this is an important concern yet it is only one part of the larger story. The larger story involves whether the novice teachers have been prepared to learn from their new experiences, including their abilities to structure their environments in ways that lead to successful learning (e.g., arrange for peer coaching). There is no preliminary education or training that can make these people experts; it can only place them on a trajectory towards expertise. (Bransford and Schwartz 1999, p. 68)

This conception is consistent with the suggestions of Lobato and Siebert (2002) who hold that transfer should be reconceived along individual and cognitive dimensions, while also examining how transfer is situated in group practices and socio-cultural aspects of the environment. To understand learning and transfer in natural and complex situations, it is important to examine how people construe situations as similar or different, regardless of whether or not the generalizations that people make across situations lead to "correct" or normative performance. Lobato's (2012) "actor-oriented transfer" perspective examines the processes by

which actors form personal relations of similarity across situations. The actor-oriented transfer perspective argues that the basis for transfer is the learner's construction of similarity rather than objectively given similar "elements" in the environment. This approach highlights the crucial question, which distinguishes the different theories of transfer: is transfer defined in terms of the qualities of the initial vs. the target situations and tasks, or is it mainly interpreted in terms of the immediate or long-term mental activities carried out by the learner in these situations?

The 'applying knowledge' metaphor of the orthodox transfer paradigm suggests that tasks across which transfer occurs remain unchanged during transfer, and that the "transfer" reproduces existing relations between fixed tasks (Beach 1999; Lehtinen and Hannula 2006). In contrast, in the actor-oriented transfer and preparation for future learning approach, the metaphor of *construction* replaces that of *application*. Relations of similarity are constructed or produced, not simply perceived or encoded. As a result, transfer situations are no longer viewed as static and unchanging but rather as dynamic sites for invention and reorganization (Lobato and Siebert 2002, p. 90).

How one recognizes the familiarity or similarity when entering new situations is important in these new approaches to transfer. If we shift our focus from very explicit experimental situations of typical transfer studies towards everyday situations or long-term learning of complex scientific or professional tasks, how people interpret the situations and recognize new phenomena with the help of their previously constructed mental concepts is far from trivial. In their article about the learning of abstract ideas, Ohlsson and Lehtinen (1997) claim that to recognize an object as an instance of abstraction, a person must already possess that abstraction. This is especially obvious in complex scientific theories like Darwinian evolution or Newtonian mechanics, as well as in many mathematical concepts. In the classical view, similarity is an epistemologically primitive category. The similarities between two particulars are the basis for creating a generalization. In contrast, Ohlsson and Lehtinen (1997) suggest that people experience particulars as similar to the extent that, and because, those particulars are recognized as instances of the same abstraction. Abstraction engenders similarity rather than vice versa.

These fresh approaches propose transfer as a preparation for future learning. They include learners' active role, interpretation and modification of the situations in a new way. This along with integrating abstract knowledge to affordances of the situation is a potentially relevant approach for explaining how people are capable of non-monotonic creation of new knowledge and practices in rapidly changing situations.

8.3.2.2 Deliberate Practice and Expertise Development

The development from novices to experts means remarkable quantitative and qualitative change in knowledge and skills. One way to explain this development is Ericsson's theory of deliberate practice.

Deliberate practice is practice, which intentionally aims at improving one's skills and competencies (Ericsson 2006; Ericsson et al. 1993). It is not enjoyable, but involves effortfully and selectively improving critical aspects of the performance. It is not a mechanical and repetitive process of making performance more and more fluid, as some studies appear to indicate (Dreyfus and Dreyfus 1986). Instead, it involves a great deal of thinking, problem solving, and reflection for analyzing, conceptualizing, and cultivating a developing performance. This includes directing and guiding future training efforts that are then fine-tuned to dynamically evolving levels of performance. It often takes place under the guidance and coaching of old masters who have already gone through a similar process and gained a great deal of experience (Gruber et al. 2008). In the musical domain, it appears critical for one to undertake solitary training in order to improve specific aspects of one's performance. Apparently, only "perfect practice" skilfully tailored to one's dynamically developing level of accomplishment makes one perfect (Ericsson 2006). Investigations indicate that human performance improves through extensive practice without any pre-given limitations. At the further stages of practice, individuals may have to invest more training in relation to each further step of improvement (Ericsson 2006). People do not become aware of the radical modifiability of their competencies because they deliberately give up training after achieving a satisfactory level of performance, which often takes place after a few dozens of hours of training.

Numerous studies carried out by Ericsson and his colleagues (Ericsson 2006; Ericsson and Lehmann 1996) indicate that the length and intensity of (masterful) deliberate practices alone explains exceptional performance and masterful accomplishments; we do not have to think (and there is no solid evidence) that even the highest performers and top masters were at the outset categorically different from other people (Ericsson 2006), i.e., were innately endowed with specific gifts or talents that would explain their excellence. The top performers have often started their practice earlier than those attaining a moderate level of performance and they have practiced much harder and more systematically (having several thousands of hours more of deliberate practice than their less accomplished colleagues, Ericsson and Lehmann 1996). All measures indicate that a superior expert engages in more intensive training rather than has any mysterious short-cuts to excellence based on their gifts. There are, furthermore, no reliable means of distinguishing those who will become elite performers during training; while many initially promising candidates fail (Starker and Ericsson 2003), some of those who do not initially show any promise may start excelling later on in training. Expert research problematizes the above mentioned cultural assumptions according to which creative achievements are based on fixed and innate gifts and talents that are trainable only to a limited extent (for criticism of such view, see Howe 1999).

It is difficult to evaluate the efficacy of the deliberate practice approach from the point of view of non-monotonic change. Definitions of deliberate practice clearly describe incremental learning which take place when people systematically practice on the limits of their existing skills and look for continuous improvement. The improvement is, at least in most of the published examples, based on detailed feedback given by coaches, tutors or colleagues and is to some extent dependant on

the knowledge these supporting people already have (Ericsson 2006). On the other hand, descriptions of deliberate practice include the idea of adaptive expertise by emphasizing the avoidance of automatization of an acceptable level of performance and the need to maintain the ability to control the execution of the skills, making intentional modifications and adjustments difficult (Ericsson 2006, pp. 684–685). In some cases, deliberate practice leads to exceptional performance and people are able to do something in a novel way, which goes beyond the constraints of prior knowledge and practices.

8.3.2.3 Theories of Conceptual Change

Ohlsson (2011) discusses the possibilities and processes of non-monotonic change in turbulent contexts, which he claims require radically new forms of knowledge and thinking. Interestingly, the same question has been asked in the science learning context, where students are basically learning very established and well known scientific knowledge. However, from students' view points, the learning of certain scientific concepts requires radical and non-monotonic restructuring of prior knowledge (Vosniadou 1994, 2008). The term "conceptual change" is used to characterize situations where learners' prior knowledge is incompatible with the requirements of the new tasks they are confronted with. During the last decades, research on conceptual change has produced a rich variety of models of the development of students' conceptual understanding and conceptual change (Chi 2008; Chi et al. 1994; Duit 1999; Ohlsson 2009; Vosniadou 1994, 1999). One of the important distinctions made by the researchers of conceptual change is the definition of learning as continuous growth or enrichment of knowledge, or as discontinuous change requiring radical restructuring of prior knowledge (Vosniadou 1994). The discontinuity of learning is defined similarly to the non-monotonic change by Ohlsson (2011) described earlier in this chapter and it occurs in a situation where prior knowledge is incompatible with the new tasks or information.

In learning certain scientific concepts, generally shared everyday beliefs or more trivial concepts learned during earlier school years are not enough to create an understanding of the requirements of the new tasks or knowledge, and in many cases prior knowledge is incompatible with the new tasks and may lead to systematic misconceptions. This means that misconceptions are not random products of insufficient learning, but have specific consequences of a particular prior knowledge. Intervention studies have indicated that when learning such scientific concepts in which systematic misconceptions frequently appear, students' prior knowledge is often resistant to teaching efforts (Limon 2001).

There are several theoretical explanations of conceptual change, which also lead to somewhat different recommendations about the instructional strategies for helping students overcome conceptual change problems. Most of the theories are directly related to the conservative nature of cognitive processes described earlier in this chapter. When new knowledge or a task is interpreted within the existing representations, the properties of prior knowledge constrain the possibilities to interpret the situation of tasks in novel ways, which are incompatible with prior knowledge.

Ontological shift theory developed by Chi focuses on the role of ontological knowledge in conceptual change (Chi 2008; Chi et al. 1994). According to this theory, a learner locates concepts to ontological categories, such as: object, matter, event, process, mental state, and so on. When learners try to learn to understand a previously unfamiliar phenomenon, they assign it some of their ontological categories typically on the basis of the most salient features of the new phenomena. As a consequence of this categorisation, the learned phenomenon is connected to the characteristics of that category. In learning scientific concepts, learners often interpret the phenomena within a wrong category for example electricity within the category of matter rather than within the category of processes (Chi et al. 1994). Changing the initial ontological category to one that is adequate to the advanced scientific interpretation of the concept has proved to be difficult and due to that learners have robust misconceptions. The theory of ontological category shift is a powerful tool for describing conceptual change problems in specific scientific concepts but it is difficult to see how widely applicable it is in the working life context.

Vosniadou (1994) has proposed an approach, which she calls framework theory. According to this view, people tend to develop relatively coherent explanatory mental models for phenomena they meet in their everyday environments. These subjective theoretical frameworks connect concrete experiences, and ontological and epistemological beliefs so that they form a sufficiently coherent model. New information is interpreted by individuals within this framework and if it conflicts with the framework it typically results only in peripheral changes in the mental models, but does not necessarily change the basic elements of the framework theory. Synthetic models described by Vosniadou (1994) are examples of situations in which conflicting information is assimilated within existing frameworks without changing it to meet the deeper requirements of the new information. When trying to understand astronomy, children today repeat the same difficulties that humankind has repeated in the course of our history. That is to understand the form of the earth and its location in the system of planets, they develop synthetic models (for example people living on a flat are inside the hollow sphere) in which the socially mediated information of earth as a sphere is connected to an initial mental model without changing the framework theory supporting the flat earth centred model. The framework theory approach and conceptual change research in general is considered to be a promising approach in studying professional learning but it has not yet been widely applied in empirical studies in working life context (Achtenhagen 1995; Tillema and Orland-Barak 2006; Sharpe 2004; Tynjälä et al. 1997).

Recent empirical research suggests that conceptual change is a very complex process that proceeds through the gradual replacement of prior beliefs and presumptions (e.g. Vosniadou 2008; Chi 2008). Researchers have agreed that these processes, which overcome serious conceptual change problems are influenced by motivational (e.g. Linnenbrink and Pintrich 2003) and metacognitive (Flavell 1979) processes. Intervention studies show that increasing a learner's meta-conceptual awareness could be an effective way to support conceptual change (e.g. Mason 2001). This means learning environments and materials, which help learners to become aware of how

they conceptualise the new phenomena and of the deeper differences between typical naïve concepts and the scientifically correct concept (Mikkilä-Erdmann 2001).

The conceptual change approach is an attractive possibility for analyzing learning, which results in radically new knowledge and skills. However, nearly all studies of this theoretical tradition have taken place in the formal science learning context. This means the presence of a more knowledgeable teacher or tutor who is able to analyse learners' misconceptions and guide them towards more advanced understanding of scientific concepts. However, this presence is not the case in turbulent working life situations in which radically new understanding should be developed. This raises the question of what triggers non-monotonic learning processes going beyond prior experience.

Early studies on conceptual change in science learning highlighted the importance of cognitive conflict as a key experience that triggers conceptual change processes (Posner et al. 1982). However, later experimental studies have shown that cognitive conflict doesn't lead to conceptual change processes in most of the cases even if there is a knowledgeable teacher organizing a planned conflict experience for learners (Limon 2001; Merenluoto and Lehtinen 2004). In a turbulent working life situation it becomes even more challenging and it is important to analyse how people recognize the cognitive conflict between their prior knowledge and new demands in a way that results in adequate conceptual change process.

Merenluoto and Lehtinen (2004) proposed a theoretical model of the dynamics of motivational, metacognitive and cognitive processes in experiencing cognitive conflict and conceptual change. The starting point in the model is a learning situation, where learners engage with tasks and materials that include phenomena calling for new conceptual understanding. The model is based on the assumption that the perception of the task (task situation) is influenced by students' cognitive, metacognitive, and motivational sensitivity to the task. Sensitivity in this model refers to the extent to which students are aware of, and interested in the novel cognitive aspects of the phenomenon. Cognitive and metacognitive sensitivity refers to the relation between a learners' prior knowledge and the cognitive demands of the task, and to the meta-conceptual awareness about their thinking about this relationship (e.g. Mason 2001). Motivational sensitivity describes the learners' tendency to look for novel and surprising features during learning activities (Merenluoto and Lehtinen 2004). Low sensitivity (cognitive, metacognitive or motivational) means that a person doesn't feel any need to develop new skills or acquire new knowledge, which would better enable them to manage new situations.

High sensitivity means that a person has sufficient prior knowledge to understand the cognitive demands of the task, which go beyond his or her current conceptual understanding, and is disposed to pay attention to the unknown features of the situation (Merenluoto and Lehtinen 2004). This is related to the expert vs. novice differences. In new problem situations, novices tend to pay attention to the superficial features of the tasks, whereas experts perceive the tasks in terms of underlying general principles (Chi et al. 1988). In turbulent professional changes new aspects of situations requiring conceptual change lie typically on the conceptual level and are not necessary observable on the surface level. The definition of sensitivity is similar to

the dynamic expertise model of Bereiter and Scardamalia (1993) where expertise is seen more as an orientation for seeking new challenges, than as a static state of established skills. A similar emphasis of sensitivity to new challenges is one of the key features the adaptive expertise model of Hatano and Inagaki (1986).

The experience of a cognitive conflict then leads to reduced certainty (e.g. Efklides et al. 1999; Merenluoto and Lehtinen 2004). This means that learners do not base their thinking merely on established knowledge, but are prepared to change their knowledge beliefs. Because in real professional situations the conceptual change process and construction of deeply new understanding takes time, learners need to tolerate cognitive ambiguity (Frenkel-Brunswik 1948) when reconsidering prior knowledge and beliefs (e.g. Stark et al. 2002). Thus, coping with a new complex conceptual system is possible only if learner have sufficient metacognitive skills and motivational orientation to grasp novel and conflicting features of the situation (sensitivity). These skills are, however, not sufficient as they also need to be motivated to tolerate ambiguity, and to trust that the experienced conflicts are solvable.

8.4 Conclusions

In the course of its development, humankind has been able to cope with catastrophic changes in their environment and has managed to develop more advanced knowledge, skills, and understanding of the world. All of this has made it possible for us to overcome the constraints of physical environments and some biological properties. This has required learning, which goes beyond our previous experience and prior knowledge and enables a non-monotonic creation of completely new ways of understanding the world. The ability to cope with rapid changes and pro-actively create new innovative ideas has become increasingly important in the turbulent working life of today. In this chapter our aim was to review some of the theoretical approaches within learning research, which try to describe this type of learning.

When dealing with the challenges of changing situations the major problem with traditional theories of learning is that these are practically all focused on the mediation of existing knowledge, skills and practices to new generations. Behaviourist and association theories describe how people learn simple factual knowledge or desired behaviour as a consequence of a direct influence of their environment, cognitive theories describe how prior knowledge constrains the interpretation of new situations and explains learning as a gradual enrichment of existing representations, and socio-cultural and situated theories base learning on gradually deepening participation in existing cultural activities. These theories provide a rich basis for organising education and learning opportunities within workplaces for learning established knowledge and practices. However, these mainstream theories fail to offer a solid basis for understanding how people should be educated to cope with rapid change and for a future working life which does not yet exist.

However, within cognitive and socio-cultural traditions there have been attempts to create approaches, which are aimed at describing how the expansion of

knowledge, innovation, and radical change in the way in which people conceptualize phenomena would be possible. The examples of socio-cultural theories described in this chapter have been developed and applied in a professional context and are thus better known among the professional learning and development research community. Some of the individual level cognitive approaches described in this chapter have mainly been used among researchers studying children's and adolescent's learning and applied in a school context. However, the findings of conceptual change research and the new idea of transfer as an active process and as preparation for future learning would be helpful for addressing the challenges of professional and vocational training in rapidly changing situations.

In this chapter, we applied ideas of complex systems in organising different theoretical approaches to different interdependent but irreducible units of analysis. Promising theories describing radical and non-monotonic change have been developed within the sociocultural and individual cognition levels, but well elaborated models to describe the role of mutual interaction between the levels are still rare. For developing learning environments for professional and vocational learning that assist address rapid change needs well elaborated and empirically tested theories. These will need to deal with non-monotonic change on both, individual and socio-cultural levels, and also a advanced conceptual understanding how these levels interact in different situations in workplaces and schools. To develop more powerful theoretical approaches to deal with rapid and deep going change we should consider the ways in which different theories describing individual learning could be integrated and how these individual level processes could be framed within the sociocultural context.

We propose that Ericsson's theory of deliberate practice is a promising starting point for analysing possibilities of professional learning on the individual level when confronted with radically new challenges. Although most examples of deliberate practice describe expertise development in established fields of expertise with the help of knowledgeable coaching, deliberate practice seems to also have an important role in processes in which fundamentally new ideas and applications are developed (Ericsson 1999; Weisberg 2006). Deliberate practice provides individuals with techniques and skills needed in the process where new ideas and applications are developed (Weisberg 2006).

However, deliberate practice theory does not offer conceptual tools for analysing the nature of the cognitive processes needed in the non-monotonic learning processes. Based on the previous analyses of different theoretical approaches we propose that integration of the findings of conceptual change research and deliberate practice would be a promising approach for analysing professional learning which results in radically new knowledge and work practices. On the one hand, deliberate practice strengthens established processes and interpretation and thus, in principle, increases the probability of applying established interpretations and processes in changing situations in which they are not any longer adequate. On the other hand, deliberate practice may help people see more deeply the discrepancy between their prior knowledge and the requirements of the changed situations. This makes it possible for them to develop meta-conceptual awareness, which is the key aspect of successful

conceptual change. Furthermore, the change of interpretations of the new professional situations on a merely conceptual level is not enough. A new level of deliberate practice is needed within the changed conceptual framework, which results in new innovations and work processes (c.f. Weisberg 2006). Furthermore, the ideas, reviewed earlier in this chapter, such as the alternative transfer theories describing transfer as actor oriented preparation for future learning may give valuable approaches for analysing the formation of deliberate practice within the changed conceptual frameworks.

Weisberg's (2006) detailed analyses of the processes related to historically important innovations not only show the importance of deliberate practice but also the collective nature of innovations. The persons working on the problems are embedded in knowledge cultures and facilitated by existing cultural artefacts. The collaborative knowledge creation approach (Hakkarainen et al. 2004a; Paavola and Hakkarainen 2005) provides us with the conceptual tools for analysing how different aspects of individual level deliberate practice and conceptual change are supported by the collective processes typical for innovative knowledge creating communities.

It is, however, beyond the possibilities of this chapter to present an elaborated theoretical model of the relationships of learning processes at different levels within the complex system of individual and collaborative learning confronted with radically new challenges in working life. Nevertheless, we believe that in future research on professional and work place learning it is important to make use of a larger variety of theoretical ideas and empirical findings of learning research which focus on individual and collective learning processes. There are valuable theoretical approaches in different fields of learning research, which have not been widely used within the professional learning research community.

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Chapter 9

Understanding Learning for Work: Contributions from Discourse and Interaction Analysis

Laurent Filliettaz

Abstract In recent years, interaction and discourse analytic methods have been applied extensively in various areas of educational research and have become an important theoretical perspective for those concerned with the study of learning in social settings. Following this innovative perspective, this chapter advances two main arguments. First, it stresses the idea that adopting a discursive and interactional approach on professional practice can contribute to the body of concepts and methods applied for understanding practice-based learning. And second, it considers that there exists a strong epistemological continuity between social theories of learning on the one hand, and research methods belonging to the field of discourse and interaction analysis on the second hand. From there, the aim of the chapter is to identify and specify an interdisciplinary field intersecting linguistics methods and professional education research. It is also to show what these methods consist of, how they may be enacted and applied and what are their potentialities and practical implications for researching the field of professional and practice-based learning.

Keywords Discourse • Interaction • Language • Knowledge • Identity • Context • Multimodality

In recent years, interaction and discourse analytic methods have been applied extensively in various areas of educational research and have become an important theoretical perspective for those concerned with the study of learning in social settings. Initially conceived as descriptive tools elaborated by linguists for describing the complex organisation of language use in context, these methods have progressively been seen as powerful resources to gain a fine-grained understanding

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of teaching and learning processes in a wide range of formal and informal educational contexts. By studying discourse and interaction within classrooms and other educational settings, researchers have provided new insights into the dynamic relationships among language use, social practice, and learning. More specifically, they have provided understandings of the ways in which learning opportunities are constructed across time, groups, social institutions and joint actions.

Following this innovative perspective, this chapter advances two main arguments. First, it stresses the idea that adopting a discursive and interactional approach on professional practice can contribute to the body of concepts and methods applied for understanding practice-based learning. And second, it considers that there exists a strong epistemological continuity between social theories of learning on the one hand, and research methods belonging to the field of discourse and interaction analysis on the second hand. From there, the aim of the chapter is to identify and specify an interdisciplinary field intersecting linguistics methods and professional education research. It is also to show what these methods consist of, how they may be enacted and applied and what are their potentialities and practical implications for researching the field of professional and practice-based learning.

To address these issues, the chapter is divided in five main sections. The first section retraces the origins of a so-called workplace discourse research field. It reflects on the growing importance of discourse and interaction within contemporary workplaces and emphasises the role of language in social theories of learning, as they have been extensively disseminated within vocational and professional education research. These bring empirical as well as theoretical arguments for an interdisciplinary examination of discourse-mediated practices through which workers encounter learning experiences at work. The second section is designed to provide the reader with a synthetic understanding of discourse and interaction analysis. Key concepts and principles underlying this multidisciplinary field are exposed and the main requirements underlying methodological aspects are briefly summarised. The third section illustrates how the study of discourse and interaction may contribute to the understanding of professional and practice-based learning. It identifies a range of research topics that have been investigated from an interactional and discursive perspective and reports on recent research conducted internationally on these topics. Section 9.4 provides further illustration of how discourse analytic methods may be enacted to inform practice-based learning research. Referring to empirical data recently collected in the context of the Swiss vocational education and training system, the chapter observes how guidance is interactionally accomplished in discourse and how apprentices and supervisors use a variety of semiotic resources to shape learning opportunities in work production activities. To conclude, the fifth section discusses the potentialities and challenges associated with a discursive methodology and stresses its practical applications and implications for vocational and professional education.

9.1 The Emergence of Workplace Discourse Research

In the past two decades, a growing number of scholars with an expertise in various areas of linguistics have become interested in analysing and interpreting empirical data collected in professional settings. Depending on their theoretical backgrounds and origins, research topics conducted in this area have endorsed multiple labels, including for instance *institutional talk* (Drew and Heritage 1992), *professional discourse* (Candlin 2002), *workplace studies* (Heath, Knoblauch and Luff 2000), *organisational discourse* (Boden 1994), *language in the workplace* (Boutet 2008; Holmes and Stubbe 2003), *business discourse* (Bargiela-Chiappini 2009) or *workplace discourse* (Koester 2010). This body of research does not constitute a coherent and well-integrated research field, but it assumes that a fine-grained analysis of how workers make use of language, both in its oral and written forms, may contribute to better understand professional practice and the conditions in which it unfolds. Reciprocally to this “professional turn” in applied linguistics, it is also noteworthy that researchers in adult and vocational education often stress the role of language in professional learning and development and therefore refer to concepts related to linguistic theories.

Elaborating on the idea that there is a growing interest for an interdisciplinary research domain intersecting linguistics and professional education research, this section investigates why it is relevant and productive to care about discourse and interaction when investigating professional and practice-based learning. In the following paragraphs, empirical as well as theoretical arguments are brought for a multidisciplinary cross-examination of learning for work. We stress the importance of discourse and interaction processes in workplace practices and argue for epistemological continuities between social theories of learning and the study of language in action.

9.1.1 *The Linguistic Demands of the Contemporary Workplace*

There are strong empirical reasons why researchers concerned with the study of learning in and for professional practice should be concerned about the role and place of discourse and interaction in the workplace. As numerous sociolinguists have noted (Boutet 2008; Heller 2003), the historical evolution of work itself has established increased demands regarding language use and communication skills. In their everyday professional practice, workers are expected to share information, to solve problems, to cooperate with colleagues, to plan future actions or report on past experiences. This is particularly true in the context of what is often referred to as the “new work order” (Gee et al. 1996), an economy that is strongly dominated by the service sector, by information and communication technologies, by a dematerialization of production and by globalized management strategies. In many respects, the contemporary workplace sees language use not only as a peripheral

ingredient but as a central component through which professional practice occurs. In a sense, this has always been true for professional sectors such as education, health, law or social work. But these linguistic demands are also becoming increasingly significant in other domains from which they were historically perceived as absent or peripheral, such as the industrial sector for instance. It is now commonly expected from all workers that they should be able to cooperate with colleagues, have sufficient literacy and numeracy skills, adapt to norms and procedure that may take written or oral forms, and be capable of reflexive thinking. In other terms, discourse and interaction processes have become progressively perceived as productive resources and not anymore as a mere distraction.

In recognising the configuring role of discourse and interaction in contemporary workplaces, sociolinguists have also highlighted the multiple functions endorsed by linguistic resources in workplace contexts. These functions include practical, social as well as cognitive dimensions of professional practice (Lacoste 2001). First, language use at work has often been reported as serving practical functions. It is by engaging in discourse and interaction that workers “get things done”, that they plan and anticipate future actions, perform them, and provide accounts and evaluations about past events. Second, linguistic resources are also used by workers as resources for accomplishing the social dimensions of professional practices. They are means through which workers position themselves in groups, endorse specific identities, produce or reproduce cultural communities or establish power relations. And finally, linguistic resources as they are used in workplace discourse and interaction also serve cognitive processes related to memory, problem solving and learning. It is by engaging in discourse and interaction that workers share and negotiate a joint understanding of the world, that they take decisions, reflect on their experiences and that they may learn from more experienced workers.

Acknowledging the centrality and multifunctional nature of language use in professional practice has significant implications for vocational and professional education. These implications include reinforced expectations in terms of training and a renewed understanding of the skills and competences workers must share for facing the demands of the contemporary workplace. It is indeed of primary importance to prepare and adapt the workforce to the multilingual, globalized and discourse-mediated professional practices dominating the “new work order”. And it is also important to provide workers with resources that may assist them in facing these specific demands. At a more theoretical level, these evolutions also shed new light on the ways language and communication skills may be perceived in vocational and professional education. In the contemporary context referred to, these skills are not to be seen as “soft” or related to a general cultural background; rather, they have to be considered as key instruments for professional practice and as integral components of professional competences. Finally, it should also be noted that the “linguistic turn” mentioned here leads to a reconceptualisation of the relations linking language and education. Language, in such a perspective, is not only a matter of teaching and learning or a cultural tool that has to be acquired; it is also a means through which workers experience learning at work and therefore an important condition for learning through practice. This is what the next section proposes to develop.

9.1.2 *The Linguistic Aspects of Learning Processes*

Social theories of learning have recurrently underlined the collective and distributed nature of learning processes and the configuring role of “the others” and language in the ways individuals access and interiorise knowledge and develop skills. The Vygotskian concept of the zone of proximal development (ZPD) defined as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult *guidance* or in collaboration with more able peers” (Vygotsky 1978, p. 85) is often regarded as a central reference point for approaches that see learning processes as involving a plurality of individuals. From the Vygotskian perspective, it is assumed that psychological development does not consist of a process of individual and biological maturation but involves close interactions with the cultural environment and with more experienced individuals. Guidance and verbal interaction, in this framework, appear as important conditions for expanding the zone of proximal development and for developing problem-solving skills. Vygotsky also argued that the acquisition and use of language transforms children’s thinking. He proposed to see language as a “cultural tool” having a profound effect on both collective and individual thinking. One of the distinctive strengths of his theoretical model is that it “explains not only how individuals learn from interaction with others, but also how collective understanding is created from interactions amongst individuals” (Mercer and Howe 2012, p. 13).

Closely aligned to Vygotsky’s theory of psychological development, Bruner’s concept of “scaffolding” has often been used in sociocultural psychology to refer to discourse processes through which individuals are guided in their learning. Initially developed in the context of dyadic interactions between parents and young children (Bruner 1983; Wood et al. 1976), the concept of scaffolding is defined as a discourse mediated teaching and learning process, wherein the adult helps the child progress from assisted performance to unassisted once. Based on this seminal work, numerous scholars have attempted to transpose the concept of scaffolding into the context of school interactions (Panselinas and Komis 2009; Rojas-Drummond and Mercer 2003) in order to investigate the educative value of various sorts of dialogues (i.e. teacher-led dialogues; peer group discussions). From this standpoint, questioning practices initiated by teachers have been seen as powerful communicative means by which students are guided to elaborate their own thinking.

By transferring the concepts of guidance, scaffolding and the zone of proximal development beyond the limits of the classroom, contemporary approaches to professional learning have promoted new ways of understanding the relations between learning and work. In this respect, convincing alternatives to the distinction between formal and informal education have been advanced (Evans et al. 2006; Guile and Young 1998). In Lave and Wenger’s anthropological approach to apprenticeship for instance (Lave and Wenger 1991; Wenger 1998), participation in communities of practice is seen as an important means by which newcomers gain access to knowledge and develop practical skills in specific production contexts. Learning is not exclusively about the acquisition of expertise and practical intelligence, but also comprises a process of

identity transformation. That is, under specific conditions, including participation to communicative events, newcomers are progressively recognised as members of communities of practice as they move from peripheral to full participation.

Another particularly interesting contribution to this field is Billett's model of "relational dependencies" between social and personal ingredients to learning in the workplace (Billett 2001a, b). In line with sociocultural approaches, Billett sees learning in and through practice as related to "participatory practices" by which workers gain access to specific actions in workplace contexts. But, as pointed by Billett (2001a), "it is inadequate to believe that learning simply by just doing it will suffice" (p. 7). Both social and personal factors may either support or on the contrary hinder learning opportunities. Social factors are designated as "affordances". Affordances include for instance the sort of guidance provided to novice workers, the type of expertise available or not and more globally the range of resources workplace contexts are able to provide to learners. Personal factors are referred to as "engagement". Engagement is related to the specific ways individual workers elect to make use of the resources afforded to them in the workplace. These individual factors include for instance personal values, prior experiences and personal epistemologies. Affordances and engagement are seen as key determinants of learning in the workplace and as shaped by a relation of interdependence. Interestingly, Billett's model of "relational dependencies" between social and personal components acknowledges the contributions of language, discourse and other semiotic means to learning in professional practice. When describing efficient strategies by which close guidance may be afforded to workers, Billett (2001a, p. 144ss) proposes to see *questioning dialogues*, the production of *models* and *analogies* as processes through which workers elaborate, substantiate and extend their thinking. He thereby recognises the existence and potentialities of "scaffolding" strategies beyond the limits of the classroom and applies them to the understanding of professional learning.

From this brief inquiry into sociocultural theories of learning, it results that substantial connections exist between the "linguistic turn" taken by researchers in professional education and the ways sociolinguists approach workplace practices. In both fields, language use is seen as a major mediating tool by which individuals engage in social practices and encounter local, cultural and psychological transformations. Based on what can be seen as a strong epistemological continuity between sociolinguistic theory and sociocultural psychology, a growing number of scholars have applied discourse and interaction analytic methods for gaining a better understanding of how individuals learn in and from professional practice. This is what the next sections will illustrate and discuss.

9.2 Principles, Concepts and Methods of Interaction and Discourse Analysis

What is exactly discourse and interaction analysis and what underlying theoretical principles is it based on? There are of course many different ways to answer these questions but a common way to refer to discourse and interaction analysis is to

define it as the study of language use in relation to specific institutional and cultural contexts and with regard to its cognitive and social implications (Wodak and Meyer 2001). Discourse and interaction analysis does not constitute a unified research field but should be seen as a multidisciplinary approach made of a plurality of paradigms. The selected methodologies draw upon concepts and analytic categories from various fields of linguistics, such as interactional sociolinguistics (Gumperz 1982), conversation analysis (Sacks et al. 1978; Schegloff 2007) and critical discourse analysis (Van Dijk 1997; Wodak 1997). These fields have explored multiple avenues of linguistics and are often seen as offering competing or contradictory approaches for analysing discourse and interaction. Nevertheless, these frameworks also share common assumptions about language and social life. In particular, they view language not only as way of transferring information from speakers to recipients, but as a historical and culturally shaped medium through which individuals take actions, achieve cooperation, align identities, participate in social events and share a joint understanding of the world in which they evolve. In observing the con-creted actions among members and describing how these members communicate and interact, discourse analysts examine what members produce together, what they hold each other accountable for, and how they make sense of actions of others. In doing so, they identify patterns of practice that make visible what members need to know, produce, and interpret to participate in socially appropriate ways.

Beyond the internal boundaries that delimit distinct trends and affiliations in discourse analysis, a number of concepts and methodological requirements can be seen as shared principles across interaction and discourse analysts. In this section, these principles are made visible and a range of assumptions are selected that may be helpful to understand how discourse and interaction relates to professional and practice-based learning.

9.2.1 Key Concepts in Interaction and Discourse Analysis

In what follows, four key concepts are presented and commented, that have been broadly applied in various trends in discourse and interaction analysis: *contextual indexicality*; *situated identities*; *sequential organisation* and *multimodal meaning making*. It might be arbitrary to focus exclusively on these four categories, but these concepts shape diverse properties of discourses and relate to complementary theoretical perspectives adopted in the field. They can be seen as good candidates for introducing the field of discourse and interaction analysis.

The first concept closely related to a discourse analytic perspective is that of *contextual indexicality*. This concept relates to the idea that language use is seen as being cosubstantially linked to the contexts in which it is produced. It is indeed widely accepted amongst discourse analysts that discourses entertain multiple and complex relations with the social and material conditions in which they take place. On the one hand, discourses are often seen as being shaped by contexts in the sense that historic, cultural and material arrangements exert a form of influence on the

ways discourses are produced. But on the other hand, discourses are also shaping these contexts in the sense that participants may use linguistic resources to make visible how they interpret specific contextual arrangements (Duranti and Goodwin 1992). Within interactional sociolinguistics, Erving Goffman's framing theory has often been used as an important contribution to such a dynamic and constructivist conception of context in discourse analysis. This theory stresses the idea that the meaning of ordinary perceptions and human behaviour is highly premised in light of natural and social "frames" (Goffman 1974). These "frames" shape the ways individuals interpret social reality and adapt their own conducts to such interpretations. Developing William James' and Gregory Bateson's ideas, Goffman considers that these framing processes are never fixed, but are vulnerable to change. People may misunderstand the meaning of contextual arrangements; they may also be abused or influenced to produce false interpretations; finally, they may also revise the meaning they attribute to the reality they experience in social life. From such a *dynamic* perspective, "contexts" can be seen as the result of a process of "contextualisation" through which participants jointly negotiate how to interpret the conditions in which social action takes place. Such a renewed perspective on context and contextualisation deeply transforms the way the relations between contexts and language in social interaction is being looked at. As put by Gumperz (1982) amongst others, language use in interaction is not only shaped by the social conditions in which it takes place, it is also "context renewing" in the sense that participants may use it as "cues" to make inferences about what the context "is" and how to initiate changes to its local configuration.

Closely related to the principle of contextual indexicality, the notion of *situated identity* has often been used by discourse analysts to understand how participants to social interaction position themselves according to each other and with regard to broader cultural and institutional arrangements. Following Goffman again, these processes of positioning are not perceived as determined by preexisting social roles, but endorsed by participants in discourse and interaction itself (Goffman 1961). It is by "doing being" a person of a certain kind that participants endorse particular identities in social action and that they place co-participants in a reciprocal position. To capture this dynamic conception of relational work in interaction, the concept of *situated identity* has sometimes been used to stress how social relations are deeply shaped by local arrangements. For Zimmerman (1998), "situated identities come into play within the precincts of particular types of situations" (p. 90). These situations are effectively brought into being by participants engaging in activities and respecting specific agendas. It is by endorsing specific roles in discourse that participants display an orientation to these situated identities and that they make visible how they align or not the social values attached to them. In that sense, situated identities are very much a product of discourse and interaction rather than a personal attribute belonging to individuals.

To understand how these contextual arrangements and situated identities are dynamically produced in discourse and interaction, the concept of *sequential organisation* has often been used to capture the local temporal processes through which interaction unfolds. The notion of sequential organisation has been primarily investigated by conversation analysts and ethnomethodologists, who see it as a

central principle underlying situated interaction (Sacks 1992; Schegloff 2007; Ten Have 2007). By using the concept of sequential organisation, conversation analysts understand that social actions jointly accomplished by a plurality of participants do not unfold in an arbitrary way but reflect a specific social order. To align to this social order and to make it visible, participants engage in fine-grained coordination processes in which they take turns, use adequate places for leaving the floor to coparticipants and orient to the successive steps by which action is accomplished. From there, conversation analysts consider the sequential organisation of talk-in-interaction as the dynamic process through which participants make their actions publically accountable and shape interpretations about what they perceive as relevant in the context. The machinery of turn-taking in interaction becomes a resource for interpreting how participants orient to each other and accomplish a joint understanding of their actions.

The sequential organisation of interaction and its contribution to the understanding of contexts and the endorsement of situated identity does not exclusively rely on linguistic units; on the contrary, it also involves a wide range of other semiotic systems participants may use as resources for coordinating their participation. To refer to this multitude of semiotic resources combined in discourse and interaction, the concept of *multimodality* has recently emerged as a solid reference point within discourse theories. Multimodal discourse and interaction analysts originate from a variety of subdomains of linguistics such conversation analysis (Goodwin 2000), mediated discourse analysis (Levine and Scollon 2004; Norris 2004) or social semiotics (Kress and Van Leeuwen 1996). These various disciplines have developed distinct approaches to discourse and interaction, but they also share a tendency to break away from a logocentric view on language and communication. The concept of multimodality relates to the plurality of semiotic modes combined in human behaviour (gestures, gazes, body movements, spatial displays, images, objects, voices, texts, etc.) and to the local arrangements through which they are used as tools for accomplishing social actions. For multimodal discourse and interaction analysts, participants are constantly engaged in complex meaning-making processes in which they have to produce a joint understanding of their actions. It is by using and combining a plurality of modes that they produce and interpret meaning in context and that they elect to orient to specific resources (or not). Considering that these choices are not arbitrary but also, to some extent, shaped by the specific potentialities of these resources themselves and the conditions in which they are used, participants also express forms of agencies through the specific ways they make use of semiotic tools in interaction. Here is another instance of the close connections that exist between semiotic forms and their psycho-social implications.

9.2.2 Methodological Implications

The concepts presented above and the theoretical principles they are aligned with have significant implications at methodological level. Discourse and interaction analysts do not all use the same research methods, but the methodologies they enact follow, at least to some extent, convergent lines that can be specified as follows.

One first way to specify the methodological requirements underlying a discursive perspective relates to the role and nature of data used for research. Empirical data is central for discourse and interaction analysis in the sense they constitute the primary material on which the analysis is based. Data consist in written, oral and multimodal behaviour through which individuals accomplish social practices in specific contexts. Discourse and interaction analysts usually do not artificially provoke the data they are putting under scrutiny. They collect these data in the natural conditions in which they occur and conduct field work to gain access to such data. From there, close connections often exist between discourse analysis and the ethnographic perspective (Gee and Green 1998). Data collection should not be seen as a capturing process from which the observer is radically absent. On the contrary, it is the outcome of a joint elaboration and the result of a complex relational process in which the researcher has progressively acquired an understanding of the observed practices and made his presence understandable and acceptable to the observed participants.

A second way to specify methodological requirements associated with discourse and interaction analysis is to comment on the sorts of technologies used for collecting data. For capturing the indexical, dynamic and multimodal nature of situated interactions, discourse and interaction analysts have progressively come to use video recordings for research purposes (Erickson 2004a; Heath et al. 2010). Video recordings of naturally occurring talk-in-interaction capture the fine-grained details of how interaction unfolds, its relations with specific material and practical arrangements, and the complex range of semiotic resources used and combined by participants. The filming of discourse and interaction itself is not perceived as an objective process that gives direct access to all aspects of social practices. On the contrary, discourse and interaction analysts consider that recordings are very much shaped by the researchers' choices and by the kind of relation researchers established with the individuals they observe. From there, audio-video recordings of naturally occurring talk-in-interaction also express subjective and intersubjective dimensions.

Discourse and interaction analysts usually never work directly on audio-video recordings but produce mediated forms of data consisting in transcripts. Transcripts give a written and synthetic form of verbal and non-verbal behaviour as they unfold on audio-video recordings. They do not capture all aspects of what is possible to perceive on these recordings but make relevant details available to the analysis by using explicit transcription conventions. Apart from conversation analysis, which has developed a well-established and explicit conventional system (Jefferson 2004), there does not exist a unique and unified convention regarding the way to produce transcripts. These norms and practices are largely dependent on the purposes of the analysis itself and have to be regarded as theoretically oriented (Ochs 1979). However, beyond these theoretical variations, discourse and interaction analysts usually align to the principles underlying their conception of language use in context. Most of the transcripts aim at capturing the dynamic and sequential nature talk-in-interaction and have progressively integrated a growing range of information related to multimodal aspects of interaction (Norris 2004).

It is based on these transcripts and the audio-video recordings they refer to that discourse and interaction analysts produce interpretations about the social practices they study. The analytic approach underlying this perspective is highly qualitative but based not only on the contents expressed in the data. Details regarding the unfolding process of interaction are seen as meaningful cues for understanding how these contents have been understood by participants themselves. From there, analytic interpretations are based both on a general ethnographic understanding of the contexts in which data has been collected and on the qualitative properties of these data and their dynamic unfolding.

9.3 Discourse and Interaction Analysis as a Tool for Understanding Professional and Practice-Based Learning

By changing the focus from the description of the linguistic system to the organisation of social action, interactional and multimodal approaches to discourse have progressively been seen as research methods beyond the limits of linguistics. In many areas of educational research, discourse analytical methods have been applied as a way to explore multiple facets of educational practices (Rex et al. 2006). In the field of teaching and learning in schools for instance, concepts and tools borrowed from conversation analysis and interactional sociolinguistics have been extensively applied to describe and understand the specific patterns of classroom interaction and the conditions under which students access knowledge in the context of the classroom (Gee and Green 1998; Macbeth 2003; Mehan 1979; Mercer and Howe 2012). Applied linguists have also adopted a multimodal perspective for understanding how teachers and students make use of multiple semiotic modes to engage complex meaning-making processes in class (Kress et al. 2001).

Recently, discourse analytic tools have also been applied in vocational and professional education research so as to account for educational practices that take place outside the specific school context. In the following paragraphs, we highlight a range of research topics that have been investigated with a methodological focus on discourse and interaction and stress how these research topics illuminate our understanding of professional and practice-based learning. To do so, we will report not only on our own work but also on a more general body of research conducted in European countries and beyond.

9.3.1 Knowledge Transmission and Acquisition

One first research area for which discourse analytic methods may be fruitfully used relates to the understanding of the complex sorts of knowledge underlying professional practice and the specific ways these knowledge are made accessible to

workers in practice. Workplace learning theories usually consider that professional learning relates to multiple sorts of knowledge, including *conceptual*, *procedural* and *dispositional* components (Billett 2001a, p. 50ss). But little is known about the ways these various components of professional learning are transmitted and acquired, and how discourse and interaction helps workers to make these knowledge visible and accessible.

In an extensive research program conducted in our team at the University of Geneva,¹ we precisely addressed these sorts of issues and aimed at understanding how apprentices enrolled in practice-based apprenticeship programs in Switzerland gain access to vocational knowledge in the different institutional contexts in which they are trained. Based on audio-video recordings of naturally occurring interactions between apprentices and various sorts of trainers, the research program was designed so as to access and describe typical discourse practices by which professional knowledge are shared between experts and novices. Various strategies for providing instruction in the workplace were identified, most of them being finely tuned to the unfolding of productive work task (Filliettaz 2009a). From the data analysis, we also observed that both vocational teachers and workplace supervisors abundantly use analogies when referring to vocational knowledge and skills (Filliettaz et al. 2010b). We described the main forms and functions and such analogical discourse and showed how it serves both cognitive and social purposes in instruction. We also described how specific contents are systematically reformulated and resemiotised when teachers and trainers give explanations to apprentices (Filliettaz et al. 2010a). And finally, we observed how workplace supervisors handle questioning dialogues in the workplace: how they respond to questions asked by apprentices and how they address questions to apprentices (Filliettaz 2011a). Our observations in this area show that answers are surprisingly neither the sole nor the dominant form of responses following questions in the workplace.

Beyond these linguistic aspects of knowledge transmission and acquisition, this same research program also allowed to investigate the role and impact of the material environment on teaching and learning processes. Building on a variety of empirical contexts including car mechanics and the building industry, we described how teachers and trainers handle technical objects and make use of the material environment in order make perceptual components of professional knowledge accessible to apprentices (Filliettaz 2007). These descriptions provide evidence to the idea that space and materiality should not be seen as a mere static setting in front of which instruction unfolds, but as a key resource shaped and designed by teachers and trainers in their everyday situated practice.

In a completely different empirical field, that of medical doctors' training in the UK, Roberts et al. (2000) also used discourse analytic methods to reveal implicit and often hidden aspects of professional knowledge. Observing that medical

¹This research program was sponsored by the Swiss National Science Foundation (SNF) under references PP001-106603 and PP00P1-124650. It has benefited from the valuable contributions of Ass. Prof. Ingrid de Saint-Georges, Dr. Barbara Duc and Dr. Stefano Losa.

doctors trained abroad and candidates from ethnic minorities were relatively more likely to fail their final examination, they questioned if the conditions in which oral examination was conducted provided equal opportunities for all candidates or if these could lead to discriminatory outcomes. By recording and analysing gate-keeping interviews in undergraduate and postgraduate medical examinations, Roberts et al. highlighted the large amount of tacit cultural knowledge candidates were expected to acquire and mobilise to participate effectively in the oral examination procedure itself. These analysis suggest that candidates from ethnic minorities may experience particular hidden difficulties with oral examinations and that examination boards should educate their examiners about these difficulties and their implications.

9.3.2 Guidance and Participation at Work and in Vocational Education

A second research area that has attracted considerable attention amongst linguists and professional educationists is that of guidance and participation at work and in vocational education. In recent years, a number of scholars have used principles of discourse and interaction analysis to understand how novice workers are assisted in their participation and the learning outcomes potentially associated with such guidance. This body of research has aimed at describing how workplace supervisors or trainers shape the ways learners engage in professional practice and how they may contribute, effectively or not, to professional learning.

In the research program on apprenticeship training in Switzerland referred to earlier, these issues have been explicitly investigated. A detailed analysis of the data resulted in stressing contrasted forms of guidance provided by trainers and supervisors in workplace environments (Filliettaz 2010a; Filliettaz et al. 2009). Two main models of training were identified in the companies observed. According to the first model, referred to as “assisted participation”, apprentices were progressively introduced to various facets of productivity. They generally did not work on their own but assisted experienced workers in their tasks. These workers took in charge most of the work procedure, but afforded local opportunities for apprentices to gain access to practice, under close guidance provided by an expert. According to the second model instead, apprentices were immediately put to work and were ascribed full production work tasks very early. In this second training model, the kind of guidance provided to apprentices appeared to be more distant and less oriented by training concerns than by productivity. In close relation with this later observation, another research result consisted in underlining the collective nature of guidance in the workplace (Filliettaz 2011b). Our data showed that although apprentices were usually placed under the responsibility of specific work supervisors, they interacted with a plurality of colleagues, experts, workmates, peers, etc. when they engaged in productive tasks in the workplace. Our analysis of these data revealed that the pedagogical qualities of these distributed forms of guidance varied quite substantially

across contexts. In some cases, they took the form of complementarities and continuities across evolving steps of work tasks. In other circumstances, they consisted of misalignments or controversies between competing workers.

In the Francophone field of professional didactics, a number of researchers have also become interested in the role of “tutoring”, “guidance” or “supervision” in workplace learning and have highlighted the mediating role of discourse and interaction in the ways apprentices develop skills and competences in the workplace (Kunégel 2005, 2011; Mayen 2002). In his PHD dissertation devoted to apprenticeship in the field of car-mechanics in France, Kunégel for instance describes a dynamic model capturing the relational configurations between apprentices and the supervisors at various stages of the apprenticeship pathway. Kunégel proposes to distinguish six successive steps, including a phase of “familiarisation”, a phase of “instruction” and a phase of “attribution of work production tasks”. The main interest of this model is to show that there seems to be a strong alignment between the level of competences apprentices are expected to display and the sorts of verbal and non-verbal interaction existing between apprentices and their supervisors. The other interesting contribution of this model is that it proposes to see these interactional configurations as evolving in time and not as given or static realities. From that standpoint, language and communication between apprentices and their supervisors function as central mediating tools for understanding the relations between practice and learning.

In a different context, that of air traffic control, Koskela and Palukka (2011), made similar observations. Applying the tools of conversation analysis and ethnomethodology, they explored the ways in which trainers and trainees act and interact in training situations and aimed at identifying methods of guidance and supervision in this particular context. By collecting and analysing video recordings and ethnographic material gathered at a vocational institute for aviation and in two aerodrome control tower units, Kostela and Palukka identified different instructional strategies by which trainers guided and controlled the trainee’s actions. They showed that, as trainees progressed from simulator training to the on-the-job training phase, interaction evolved from being trainer-driven to trainer-guided. These results suggest that instructions and information deliveries are finely tuned to the trainees’ performance and the local practices of particular work position endorsed at various steps of the training program.

Within the similar framework of ethnomethodology and conversation analysis, Mondada (2006) also explored patterns of interaction between trainers and trainees in work-related contexts. Her study focused on professional training in the field of surgery and aimed at identifying specific aspects of the competences trainees must acquire and display to participate adequately to complex training practices. The data used for this study consisted in audio-video recorded surgical operations available through online video conference to a group of advanced trainees. In the course of these operations, the audience had the possibility to ask questions to the chief surgeon carrying out the surgery. The analysis of these data consisted in describing the local environments in which questions were asked and the ways in which participants dealt with these questions in the complex framing context of work and training

practices. Results showed that trainees had to identify adequate positions for asking questions and that trainers' evaluations helped them in learning how and when to ask questions in such practice-based training practices. At a theoretical level, this study also highlighted specific discursive and interactional aspects related to the acquisition of professional competences. By critically discussing the concept of competence within an interactionist perspective, Mondada showed ways in which conversation analysis can inspire an approach to cognition and acquisition based on the concept of *interactional competence*, defined as relevant forms of participation emerging from social interaction.

9.3.3 *Integration of Theory and Practice*

Another topic that has been extensively investigated in vocational and professional education in reference to a discourse analytic methodology relates to the integration of theory and practice in learning through work. Numerous scholars have indeed addressed the issue of the so-called "theory-practice gap" and have aimed at understanding how school-based teaching and learning experiences may best prepare for, elaborate on or complete the provision of practice-based training. Here again, concepts and tools borrowed from discourse and interaction analysis have been used to stress the continuities or the gaps that may exist between the various institutional or epistemic ingredients that are combined in vocational or professional training programs.

In our own research, data analysis consisted in describing and illustrating continuities and boundaries between training practices as they take place in the various sites involved in the Swiss "dual" training system. Significant contrasts were observed with regard to the ways apprentices gained access to vocational knowledge in vocational schools and on the job. In vocational schools and training centres, tasks were generally designed to support learning and teachers or trainers referred explicitly to knowledge (de Saint-Georges and Filliettaz 2008; Filliettaz et al. 2010a). In the workplace instead, vocational knowledge was certainly not absent from production work tasks, but often remained implicit or unnoticed by apprentices (Filliettaz 2010b, c). Consequently, it was not so much the kinds of knowledge available in the various training sites of the dual system that characterised the learning experience of apprentices (conceptual vs. procedural knowledge). Rather it was also the means by which these various forms of knowledge were made available to apprentices (de Saint-Georges and Duc 2009). Special attention was also paid to the rhythmic conditions in which action unfolded in the various observed training sites (de Saint-Georges and Duc 2007; Filliettaz and de Saint-Georges 2006). In the workplace contexts, it was observed that time pressure was very quickly brought to the attention of apprentices and strongly shaped the learning opportunities associated with workplace environments. However, various sorts of responses to this time pressure were detected (Filliettaz 2009b). In some companies, workplace supervisors explicitly softened these temporal constraints for

themselves and for apprentices and allowed extra time for providing instruction. In some other companies, time pressure resulted in a lack of time for assisting the apprentice.

Also noteworthy is Akkerman and Bakker's study about vocational training practices in the Netherlands (Akkerman and Bakker 2012). Deploying the theoretical notion of boundary crossing, the authors conducted field work and ethnographic observation in a Dutch senior secondary vocational laboratory education program and investigated the actions and interactions taking place between school and work during apprenticeships. The study aimed at taking into account both cognitive and identity-related aspects of learning. It consisted in analyzing how apprentices' experiences at work were discussed and reflected upon with students and teachers at school. The findings revealed that what students were expected to learn in work-related practices was largely rendered invisible by the technology-mediated, scripted and socially distributed nature of their work. From there, release days seemed to provide initial ways to explicate and reflect with teachers on what was going on at work. They functioned as useful contributions to vocational learning and provided a good illustration of how school and work institutions can mutually feed each other in facilitating apprentices' learning. Here again, a fine-grained analysis of talk-in-interaction collected in training sessions during release days was used as a means to understand the sorts of learning experiences made by apprentices across various training institutions and practices.

In a rather different empirical context, the research conducted over the past 15 years at the Victoria University of Wellington in the so-called Language in the Workplace Project (LWP) also contributed in a significant way to use sociolinguistic methods for integrating theoretical and practical aspects of professional education. Since 1996, Janet Holmes and her team began an innovative study of spoken communication in New Zealand workplaces aiming at identifying the characteristics of effective communication between workers, diagnosing possible causes of miscommunication and exploring possible applications of the findings for New Zealand workplaces. Data collection began in government organisations and was progressively expanded to factories, small corporate workplaces, medical settings and IT companies. Volunteers in each organisation audio-taped everyday work-related meetings or discussions, telephone calls or social conversations. Detailed and systematic analysis of these data resulted in highlighting the complex sociopragmatic skills displayed by workers when collaborating with colleagues (Vine 2004), doing relational work (Holmes and Stubbe 2003) or exerting leadership at work (Holmes et al. 2011b). Recently, the data and findings gathered in this particular research area were also used as teaching material for migrant workers and as support for the provision of a curriculum addressed to workers with specific linguistic and sociocultural needs (Holmes et al. 2011a, b). In an academic context, learners with a migrant background learnt to identify the sociopragmatic demands of the workplace by observing and analysing empirical data collected in workplace contexts. Later on, they also used workplace experiences to make use of what they learnt and to reflect on these sociopragmatic skills.

Such integrated teaching and learning methods were progressively applied extensively in New Zealand programs for skilled migrants. They showed promising results for integrating theoretical and practical aspects of second-language acquisition in professional contexts.

9.4 Learning Through Practice as an Interactional Accomplishment

Beyond the general description of the sorts of research topics that have been recently investigated with a discursive lens, it is also important to understand how analytic tools borrowed from discourse and interaction analysis can be effectively enacted to address subjects of increased attention in vocational and professional education. In this section, these contributions are illustrated by narrowing down the scope on the topic of learning through practice and by investigating the role of contextual variation in the ways workers experience learning in professional practice. These learning experiences and contextual variations are seen as accomplished in and through interactions between co-workers and the social and material environment in which they engage.

Numerous scholars in the field of workplace learning have stressed the idea that workplaces are not equal in the resources they provide to learners and that their qualitative properties may differ in substantial ways (Tynjälä 2008). For example, Fuller and Unwin (2003) have presented a continuum of restrictive vs. expansive organisations with regard to how these support workplace learning. *Restrictive* environments are characterized by the fact that they afford limited opportunities for apprentices to be recognised as legitimate learners and learning from their work. On the contrary, *expansive* work environments are supportive to learners, afford rich learning tasks and generate opportunities for apprentices to be recognised as legitimate learners and workers. This distinction, which should be seen as a continuum, argues for the configuring role of contextual variation in learning for and from practice.

From that standpoint, it becomes increasingly important to understand how contextual arrangements in the workplace may influence learning opportunities and enhance consistent pathways through practice-based training programs. It becomes also necessary to understand the role played by skilled professionals in helping novice workers to learn in and from practice and to assist these professionals to reflect on the resources they need to use to adapt the workplace into a training site. Moreover, addressing these challenges from a research perspective raises a number of theoretical and methodological issues: how do contextual and individual factors interact in the possibility for workers to learn in and from practice? How can learning opportunities in the workplace be defined, observed and understood? How can one account for contextual variation across workplace environments and identify contextual arrangements that support learning opportunities?

To illustrate the benefits of a discursive and interactional perspective for understanding contextual variation and its impact on learning in and from practice, we now turn to empirical material collected in the context of the above mentioned research program dedicated to apprenticeship training in Switzerland. In the following sections, two contrasting case studies are provided, documenting how first-year apprentices engage in work-production tasks in two different companies located in the Geneva area. The two training sites belong to the trade of car mechanics and involve first-year apprentices at the very beginning of their apprenticeship. The first case refers to the mechanics workshop of a large public facility. It involves Michael, a first-year apprentice in mechanics and Larry, his official supervisor and manager of the repair workshop. The second case refers to a small-sized private car repair shop, hiring Samuel as an apprentice. Samuel is supervised by Jeff, a skilled mechanics who has no official tutoring functions towards apprentices.

The participants belonging to these two work and training sites have been observed regularly on a voluntary basis during several weeks in spring 2006. With their consent, observations were video recorded by the researchers. These recordings took place after a period of preparation during which participants got used to the presence of the researcher and a relation of mutual confidence was established between partners. By observing and analysing brief excerpts of audio-video recorded data documenting naturally occurring interactions between these apprentices and their trainer, the following range of questions will be addressed, related to the general theoretical frame mentioned above: What sorts of learning opportunities are being afforded to apprentices in these two distinct workplaces and how do apprentices engage with these opportunities? How do workplace supervisors and apprentices reconcile production constraints with training and learning purposes? In what sense can these work and training environments be regarded as expansive or restrictive forms of participation? And what are the contributions of discourse and interaction to the ways participants shape and transform the local contexts in which they engage?

9.4.1 Transforming a Maintenance Procedure into a Teaching Sequence

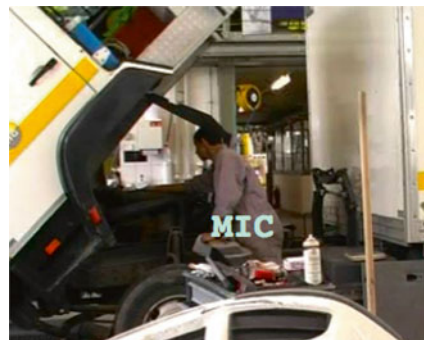
The first case relates to a car repair shop belonging to a large public facility (Company A). Michael (MIC), a novice apprentice, works in close collaboration with Larry (LAR), an experienced mechanic who acts as a supervisor and trainer within the workplace. Both the apprentice and his supervisor are conducting a maintenance procedure on a truck. At the beginning of the excerpt transcribed next, they initiate a new task included in the maintenance procedure: the cleaning and fine-tuning of the valves located at the top of the six cylinders composing the engine. Michael and Larry are standing next to each other, in front of the open hood of the lorry, when Larry initiates the following sequence of interaction.

9.4.1.1 Interaction in Company A²

1. LAR: I'm trying to find a way to turn the engine so that we can access the cylinders\ . there should be a gear door below I'll go and get a gurney\
2. MIC: yeah\
3. LAR: what you can do meantime you look where the inlet and exhaust valves are located
4. MIC: I've already found them\
5. LAR: really/. and/
6. MIC: ((points to the valves on the engine)) exhaust/ inlet/ inlet/ exhaust/ exhaust/ inlet\
7. LAR: OK that's correct\ . firing order of a six-cylinder engine/
8. MIC: I haven't learnt that yet\
9. LAR: 1-5-3-6-2-4\
10. MIC: 1-5-3-6 I'll write it down\
11. LAR: here take a sheet of paper ((gives a piece of paper to MIC))
12. MIC: you write 1-5-3-6-2-4\
13. MIC: ((writes the sequence of numbers on the paper)) **【#1】**
14. LAR: OK now that you have the firing order you find out which cylinder is connected to each valve\
15. MIC: OK\
16. LAR: and meantime I'll go and get a gurney\
17. MIC: ((MIC observes the engine and writes down the solution on a sheet of paper)) **【#2】**
18. LAR: ((comes back with a gurney))
19. MIC: so/
20. MIC: I think each cylinder with its opposite\ . the first with the sixths/ the second with the fifth/ and the third with the fourth\
21. LAR: well done/ . so let's have a look\
[...]



#1: Michael writes the firing order of the engine on a sheet of paper



#2: During Larry's absence, Michael observes the cylinders and valves composing the engine

²The original recorded data are in French, and the transcript provided here is a translation. Transcription conventions are given in the [Appendix](#) at the end of the chapter.

According to Kunégel's dynamic model of tutoring (Kunégel 2005), a specific type of guidance or training model—that of *assisted participation*—can be recognised in the excerpt just presented. Michael, the apprentice, is not working on his own or in isolation from other workers; rather, he is closely supervised by Larry, who spontaneously provides guidance and takes responsibility for conducting the maintenance procedure. At the beginning of Excerpt 1, both Michael and Larry face a specific practical problem related to the “productive” dimension of their work. To turn the cylinders in order to place them in an adequate position, they must access a gear door located below the engine. This requires the mechanics to lie on the back below the lorry and to use a sort of gurney to work in a comfortable position. Since the gurney is stored in the basement of the workshop, the supervisor proposes to leave the apprentice alone for a moment while he looks for the gurney.

Interestingly, the trainer does not see this practical problem as a mere production episode, but presents various learning opportunities to the apprentice before leaving him alone. First, Larry provides a verbal account of the problem and explains why he needs a gurney for cleaning the valves of the engine (1). Second, he makes three successive attempts to place the apprentice in an active position for when he will remain alone. The first attempt consists of asking the apprentice to find out where the inlet and exhaust valves are located (“What you can do meantime you look where the inlet and exhaust valves are located”, 3). The second attempt consists of checking whether or not the apprentice remembers the firing order of a six-cylinder engine (“firing order of a six-cylinder engine?”, 7). And, the third attempt consists of the supervisor asking Michael to figure out which cylinder is connected to each valve (“OK now you have the firing order you find out which cylinder is connected to each valve”, 14). From the apprentice's perspective, it is also notable that Michael is closely aligned to the verbal exchanges initiated by Larry. He anticipates the trainer's instructions (“I've already found them”, 4), takes note of his explanations (10, 13), and provides correct answers to his questions (6, 20).

In doing so, both Larry and Michael considerably change the local contextual arrangements underlying the interaction. They progressively transform a production procedure of maintenance into a setting in which technical knowledge emerges as a central ingredient. The trainer is not only working with the apprentice at this stage; he is teaching the apprentice how an engine operates and how its main components interact. This contextual shift from “production” to “construction”, to quote the terminology introduced by professional didactics (Pastré et al. 2006), requires the use of a wide range of multimodal resources, including talk, body orientations, gaze, gestures and material objects. Noteworthy is the fact that this contextual shift involves a specific use of the material environment, a use in which technology does not only produce specific physical results but also supports an indexical reference to knowledge. It is by observing the engine and pointing to its various components (cylinders, valves, etc.) that both the trainer and his apprentice produce a joint conceptualisation of how an engine operates (6). As shown in the excerpt, this process of contextual shift requires a fine-grained alignment between both participants, namely, the supervisor being willing to train and the apprentice being willing to engage in learning opportunities.

9.4.2 Maintaining Production as a Dominant Action Frame

In other companies, such expansive learning opportunities tend to be scarce or they may be based on different interactional configurations. To illustrate this, a second example will be used, observed in a privately owned car repair shop in the Geneva area (Company B). Samuel (SAM), a first-year apprentice, is busy conducting a maintenance procedure on a small-sized passenger car, when, whilst going through the procedure step by step, he does not remember if he should change the spark plugs or not. To clarify this issue, he moves away from the car and addresses Jeff (JEF), an experienced mechanic working in another area of the workshop.

9.4.2.1 Interaction in Company B

- 1. SAM: ((moves towards JEF))
- 2. JEF/ eh: the spark plugs on the Sonata\ ..
- 3. JEF: yes and so what/
- 4. SAM: should I change them/ . there are three of them\ . no/ I don't know about the Sonata\
- 5. JEF: ((looks at SAM silently)) **[#1]**
- 6. SAM: these are platinum spark plugs then/
- 7. JEF: ((looks at SAM silently)) **[#1]**
- 8. SAM: yep I guess these must be platinum ones\
- 9. JEF: ((looks at SAM silently)) **[#1]**
- 10. go and check in the Hyundai documentation\ ((points towards an office located next to the workshop))
- 11. SAM: OK\ . ((moves towards the office and reads the documentation)) **[#2]**
- 12. ((comes back to JEF))
- 13. right I don't need to change them\
- [...]
- 14. JEF: you should know these things\ I told you to do a 30000km maintenance and not a 90000km one\ at 30000km one doesn't need to change the spark plugs but you keep forgetting these things all the time\
- 15. SAM: sorry I didn't remember\



#1: Jef looks at Samuel silently instead of responding to his question



#2: Samuel reads the documentation to find the answer to his question

First, it can be noted that a rather different participation configuration applies to this second example. Samuel, the novice apprentice working in this garage, is fully responsible for accomplishing work production tasks on his own and he is immediately experiencing strong expectations regarding autonomy. His supervisor, Jeff, is not exclusively dedicated to training tasks but is also engaged with various specific and distinct repair and maintenance activities. This has significant implications in terms of learning and access to knowledge. These resources are not spontaneously provided to Samuel, but have to be requested by the apprentice. When facing practical problems in the maintenance procedure, Samuel has to initiate and negotiate changes in the overall participation configuration underlying the workplace context. He has to interrupt his supervisor and request assistance and information (1, 2).

Interestingly, in this particular case, Jeff does not engage immediately or easily in this request for assistance, but displays various forms of resistance to answering Samuel's question. First, he does not seem to pay attention to Samuel's question, but goes on working without interruption (3). Then, he does not provide verbal answers, but keeps on looking at the apprentice with anger (5, 7, 9). He finally refers to the documentation and asks the apprentice to find the answer himself ("go and check in the Hyundai documentation", 10). After the apprentice comes back with the answer, Jeff blames Samuel for his lack of autonomy and for forgetting important information repeatedly (14). These particular responses to Samuel's request for assistance have a clear impact on the ways in which the apprentice engages in interaction at this stage. First, Samuel has to rephrase his initial question addressed to Jeff ("should I change them? There are three of them. No? I don't know about the Sonata", 4). He is then implicitly prompted by his supervisor's insistent and disapproving gaze to come up with an answer, and has to make guesses about how to deal with spark plugs in the existing context (4, 6, 8). He also has to find out the answer on his own by referring to some documentation (11). Later, when coming back from the office, he accounts for the solution to his problem ("right I don't need to change them", 13), and responds to the trainer's blaming him by producing an action of symbolic repair in the form of an apology ("sorry I didn't remember", 15).

In sum, it appears that the local context remains strongly shaped by production constraints in this second example, and that, in contrast with the first case, work activities are not being reframed as explicit learning opportunities. The trainer seems to retain knowledge and expresses resistance to interrupt his work for the sake of providing assistance to the apprentice. Elements of technical knowledge are certainly not absent from this sequence of interaction, but these elements of knowledge are not developed into a local teaching and learning opportunity. They do not reshape the ways in which the participants engage in the local context, at least not to the same extent that could be observed in the previously described case. This results in a form of misalignment between the apprentice's need for immediate guidance and the sort of resources his supervisor is willing to provide. In the end, a climate of potential conflict and relational tension emerges between Samuel and Jeff, which illustrates a typical form of restrictive learning environment (Fuller and Unwin 2003) in which the apprentice is recognised as part of the workforce and not foremost as a legitimate learner.

From what was observed in the two case studies, it appears that apprentices experience rather diverse learning environments depending on the company in which they are trained. These environments differ in terms of access to knowledge, the willingness of supervisors to provide adequate guidance, and with regard to participation formats through which apprentices are expected to engage in production work tasks. These environments also have an impact on the learning opportunities that workplaces are able—or not able—to create for learning workers. In some training companies, apprentices are closely assisted in their work, and learning opportunities may arise in the form of explicit teaching practices. In some other companies, apprentices are expected to be productive and autonomous very quickly, and training practices are perceived as interruptions conflicting with production constraints.

It also appears that contextual variation is not only visible *across* workplaces, but also *within* each training site. Variation takes the form of a dynamic process shaping social encounters. Ordinary workplaces may evolve into virtual teaching arenas or, to the contrary, may remain highly determined by production constraints. Workplace supervisors and apprentices play an active role in the ways that these contextual shifts can be operated locally. It is by engaging in interaction and by using a complex range of multimodal resources that they produce or reproduce the conditions in which they work and learn. They may express an openness to forms of “contextual fluidity” and flexibility or may resist operating local transformations of these contextual arrangements.

9.5 Challenges and Potentialities of Discourse and Interaction Analysis

In this chapter, arguments have been brought in favour of an epistemological compatibility between sociocultural theories of learning and approaches to discourse and interaction developed within the broad field of sociolinguistics. In line with Gee and Green (1998), it has been considered that “the approach to learning that is most compatible with an ethnographically grounded perspective on discourse analysis is one that defines learning as changing patterns of participation in specific social practices within communities of practice” (p. 147). Through a brief literature review and a case study based on empirical data, concepts such as *contextual indexicality*, *situated identities*, *sequential organisation* and *multimodality* have been seen as candidates for approaching learning as participation in specific contexts and communities of practice. It has also been illustrated how a fine-grained analysis of discourse and interaction may contribute to an advanced understanding of both cognitive and identity-related aspects of professional and practice-based learning. To conclude, additional considerations are brought to this epistemological continuity and the challenges associated with the discursive methodology for research are discussed as well as its potentialities for practice.

9.5.1 *Challenges for Research*

When adopting a discursive or interactional perspective in their investigations, researchers in professional and practice-based education face numerous challenges that deserve close attention. These challenges include both ethical and methodological aspects, which are specified below.

First, it should be highlighted that increasing ethical demands are closely associated with discourse and interaction analysis. The methodological perspective being grounded on situated empirical data and these data being intrinsically related with social practices, it is important to recognise the potentially damaging and exploitative effects data collection could have on the observed participants. Discourse and interaction analysis is not and has never been a neutral enquiry into human behaviour and institutions. It contributes to the visibility of social practices and may have an impact on the positions endorsed by participants within institutions. This stresses important requirements related to access to data, permission to make use of these data and ethical clearance for research. But more interestingly, it also progressively transforms the conditions in which researchers and observed participants interact and position themselves with regard to each other (Sarangi and Candlin 2003). As noted by many discourse analysts, researchers tend not only to apply their expertise and categories to the social practices they scrutinise, but also to negotiate complex forms of collaborations with practitioners they observe. In other terms, research methods have progressively moved away from a research “on” social practices towards empowering forms of research conducted “for” and “with” practitioners themselves. As put by Cameron et al. (1994) “we understand *empowering research* as research *on, for* and *with*. One of the things we take that additional “with“ it imply is the use of interactive or dialogic research methods, as opposed to the distancing or objectifying strategies positivists are constrained to use. It is the centrality of interaction “with“ the researched that enables research to be empowering in our sense” (p. 22).

Beyond these ethical considerations, the type of research illustrated in this chapter maps important methodological challenges for the development of discourse analysis as an applied resource for research on professional and practice-based learning. First, the type of analytical approach presented here stresses the relevance of a *multimodal perspective* that does not see talk as the sole or the main medium through which social interaction unfolds. As illustrated by our empirical analysis, the apprentices’ learning experiences in the workplace do not rely on language exclusively but also on a wide range of other semiotic resources. It is by positioning themselves in material environments, by establishing visual contact with partners, by pointing specific locations and artefacts, etc. that participants enact interactional participatory practices and negotiate learning opportunities in work production contexts. Secondly, the methodology underlying discourse and interaction analysis stresses the potentialities associated with a *contrastive perspective*. Highlighting contrasts from one context to another and from one interactional configuration to another may illuminate, as in Michael’s and Samuel’s case, mechanisms of

contextual variation and differentiation in learning through practice. They may also contribute to “scale up” local findings resulting from microscopic qualitative analysis and link them with macroscopic realities observable at broader social levels (Erickson 2004b). Finally, the type of research presented in this chapter also brings interesting arguments to the development of methods that aim at “opening up the scope of discourse analysis” (Scollon and Wong Scollon 2003) by integrating a dynamic and *longitudinal perspective*. Through a detailed multimodal analysis of sequences of interaction collected in various contexts and at different steps of training programs, discourse and interaction analysis reveals the interactional micro-mechanisms through which knowledge is acquired and identities tend to sediment and become more and more fixed in time. Such a longitudinal perspective is often regarded of primary importance to understand how apprentices’ journey from the periphery of a learning community to its centre is reflected in the interactional processes. In our own research, we also take this longitudinal perspective as a very promising method for investigating “situated trajectory of learning” and understanding both successful and problematic ways of experiencing transitions from school-based teaching towards practice-based learning (Duc 2012; de Saint-Georges and Filliettaz 2008; de Saint-Georges and Duc 2009).

9.5.2 Potentialities for (Transforming) Practice

What are then the potentialities associated with discourse and interaction analysis for change and what may be its impact on educational practices? Mercer and Howe (2012) seem to make rather pessimistic claims regarding school education and observe that “sociocultural concepts and research findings seem, so far, to have had relatively little impact on educational policy and practice” (p. 17). Is this also true for vocational and professional education and training? In our view, significant practical implications derive from discourse and interaction analysis, as long as it is not narrowly conceived as an abstract methodology but serves to address broader social and educational concerns.

One first area in which discourse and interaction analysis could benefit our understanding of practice-based learning relates to the status and place of language and discourse in vocational and professional training curriculum. Interestingly, when exchanging with vocational trainers, teachers, managers or policy makers, “language” is often regarded as a limited or even narrow issue, related almost exclusively to specific contents of teaching and learning and associated mainly with the classroom context. For most apprenticeship programs available in Switzerland at upper secondary level, the curriculum indeed includes first and second language teaching courses. However, language use is rarely regarded as being involved in other areas of the curriculum and as exerting a more global influence on the conditions under which apprentices encounter learning experiences in and across the various contexts in which they are trained. To most practitioners in the field, the social visibility of language seems to be limited to the classroom context and

remains external to the workplace. A discursive and interactional methodology, on the contrary, advances a new perspective for approaching the role of language and discourse in vocational education, a perspective that sees these ingredients not as peripheral components of the training curriculum, but rather as central mediating tools for vocational learning. According to this perspective, apprentices are not only exposed to vocational knowledge in the range of contexts in which training takes place. They also encounter specific discourse practices and face numerous and often implicit or invisible expectations regarding the ways these discourses may be enacted and conducted. It is by engaging with these discourse practices that apprentices gain access to knowledge, develop practical skills and may endorse legitimate social positions within the multiple communities they belong to during their training. These language and communication skills are neither transparent nor self-evident. Like other components of vocational training, they have to be seen and most importantly learnt. Obviously, some apprentices are very successful in identifying and acquiring the specific discursive demands underlying the range of practices included their training program. Some others are not and may encounter rather challenging experiences in their journey to a professional qualification.

This later point provides a direct transition towards a second possible practical implication for discourse and interaction analysis in vocational and professional education. One area in which the type of research presented here may have significant outcomes is indeed the understanding of problematic transitions from school to work. In the context of Switzerland, but in other countries as well (Filliettaz 2010b), increasing attention has been paid in recent years to the high level of non-completion, dropout and change in apprenticeship pathways. Depending on the occupations and the geographical areas, between 20 and 40 % of apprentices who enter the dual VET system do not complete their apprenticeship within the stated terms of their contracts (Stalder and Nägele 2011). Of these: 9 % change occupation, 11 % have to repeat a year, 7 % change the training company, and 7 % drop out from the apprenticeship system without having any immediate alternative pathway. Recent studies have investigated the causes leading to young people dropping out or making changes in apprenticeship programs (Lamamra and Masdonati 2009). These studies depict a nuanced portrait of the dual VET system and show that transitions from school to work are to some extent far from smooth and unproblematic. They conclude that poor working conditions, low support by trainers and workplace relations emerge as the main causes leading to dropout. Elaborating on these findings, the strength of a discourse analytic methodology applied to vocational education practices lies in its capacity to reflect not so much on the “causes”, “reasons” and “factors” that may lead to incomplete training pathways or delayed transitions to employment, but to understand the *processes* by which these causes and factors are being enacted in practice, how attrition is constructed in action, and how apprentices, trainers and workers are experiencing relational and practical issues when engaging into work.

Beyond data description and analysis, what then are the contributions researchers could propose in order to promote changes in the realities they investigate? One particularly promising avenue currently being explored by our team at the University of Geneva is to use the empirical material available in the context of training

programs addressed to vocational trainers. As shown by the studies presented in this paper, vocational trainers in the workplace play an active role in shaping local contextual arrangements that are able to support robust learning opportunities in production conditions. In consonance with Billett's findings (Billett 2001a), the research results presented here show an urgent need to increase the level of pedagogical qualification and awareness of trainers in the field of vocational education in order to enhance the overall quality of the guidance provided in workplaces. In the training sessions we have proposed recently in various institutional contexts (Filliettaz 2012), vocational trainers of different sorts develop analytical skills in the field of discourse and interaction analysis and apply their analytical skills to empirical material collected during our research program. By combining conceptual input about social theories of vocational learning with empirical data analysis, they progressively learn to identify expansive and restrictive interaction configurations and discuss in groups about their views. Being sensitive to "contextual indexicality", "sequential organisation" and "multimodality" does not solve the complex issue of attrition in apprenticeship programs. However, from our own experience as researchers and as adult educators, it can render the sorts of difficulties faced by learners when joining the workplace visible, and it can also help trainers and experienced workers to become more reflexive about their role when it comes to assist novices in learning for and from practice.

As illustrated here, discourse and interaction analysis may appear remarkably remote from generalisable strategies and recommendations. This could be seen as a weakness and as a form of limited impact on the provision of education. But as mentioned by Gee and Green (1998), "we can also point out that it is highly improbable that answers to many of the questions facing those concerned about learning in social contexts require generalizable strategies or recommendations" (p. 160). In other words, the main outcomes of discourse-oriented methodologies for understanding learning for work seem to lie elsewhere. They rely on their capacity to illuminate questions that require local and highly situated answers.

Appendix: Transcription Conventions

CAP	Accented segments
/	Raising intonation
\	Falling intonation
XX	Uninterpretable segments
(hesitation)	Uncertain sequence of transcription
:	Lengthened syllable
.	Pause lasting less than one second
..	Pause lasting between one and two seconds
Underlined	Overlapping talk
((<i>comments</i>))	Comments regarding non-verbal behaviour
[#1]	Reference to the numbered illustration in the transcript

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Chapter 10

Research Paradigms of Practice, Work and Learning

Paul Gibbs

Abstract This chapter considers how a number of the main research paradigms are warranted when investigating professional practice. By first setting out an understanding of research, the chapter moves on to consider the shift from the neutrality of epistemological authority of certainty to the ontology of judgement, made in the uncertain flux of practice, and offers reasons to believe that certain actions are more trustworthy in explanation than others. Three main methodological discourses are discussed in the context of practice, and a fourth is proposed: a trans- or post-disciplinary approach to the messy research problems of practice. This approach is grounded in critical realism and seeks to deal with issues of normative social practice in ways that matter to those who are involved: practitioners.

Keywords Positivism • Pragmatism • Critical realism • Epistemology • Ontology • Professional practice

10.1 Introduction: Researching Professional Practice

Research into practice should carry a warning—all is not what it might seem. Experimentalists beware! Unpacking the notion of research on practice demands recognition that research itself is a practice and, like any other social activity, has an associated discourse (Higgs et al. 2010: xi). Indeed, one might argue that the discourse is revealed in a number of languages, each opening a space for justification, persuasion, and argument on why they provide a specific and insightful glimpse at the truth that is sought through the inquiry. These discourses are to advance practice, improve its quality, and discover new ways for agentic justification of

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professional intentional practice. The way that we structure and understand the phenomenon of professional practice to reveal, interpret and make sufficiently robust arguments concerned with practice reflects our belief as to what may best secure consensus for collective action and trust in a professional.

The building of such a consensus is contingent upon many influences. These range from the socio-political context of the research problem, the intellectual spaces it occupies, through to the goals inscribed in its purposeful intent. This is a messy task where a swathe of heterogeneous factors can deceive, illuminate, and contradict, and where interpretation and revelation through any form of methodology can further cloud the essential issue. This is not, however, reason to forgo researching practice in a systematic and robust way. Nor is it an argument for a relativism that bears no relation to the realism of a practical problem. Instead, it is an opening statement that illustrates the procedural limitations to researching practice, what can be legitimately relied upon and what can be claimed as truth through the many different research discourses.

The approach favoured here is a blend of a disciplinary-embodied approach with a range of methodologies selected for their fitness for purpose. To achieve it requires an understanding of the epistemological as well as the ontological issues that underpin the main approaches to research. Recognising that all approaches contain a both elements to them, the idea of a neutral reality, which can be revealed knowledge through methodologies independent of our own interpretation (as supposed by classical positivism), or that the world exists only as an ideal construction in our minds (strong constructivism) are both discussed alongside a third, the more promising approach of pragmatism. These three approaches are, however, each discounted in favour of a transdisciplinary approach to investigating practice.

This fourth approach to investigating our understanding assumes that our social work is an open system where change occurs in ways that are difficult to assign a causal attribution. It assumes that the world is fluid and open to possibilities; that neither the individual creates social context, nor that the context creates the individual. Rather, it assumes that the social is a prerequisite for the kind of professional practice that creates the person one will become. This is knowable in a predetermined way, but as a context within which one is able to operate. We are thus agentic within social, cultural, and political environments that shape our material-economic positioning within any given locale. Following Kemmis and Smith (2008), the situational 'extra-individual' features of practice create this environment in which the architecture of practice (i.e. its traditions, rituals, and practices) both limits the focus for individual and collective interpretations of their practical agency, and in so doing opens new possibilities. The surgeon cannot disregard her professional accountabilities, but in the novel experience of each operation often calls forth her creativity in ways unique to that specific surgeon. We may call this her 'mastery', for it is more than mere expert delivery of practice. It is the integration of skills, judgement and interpretation in a situation of uncertainty and fluidity where each action changes the context of the next. Mastery of professional practice transcends mere skill, and its investigation requires an epistemological stance that recognises the reality of the circumstances from a number of perspectives. Positivism assumes neutrality; constructivism, some

privileged personal knowledge; pragmatism, a transient confidence in the reliability of an action; and critical realistic transdisciplinarity assumes a theoretical approach to guide the messiness of real, live, solution of problems.

This chapter develops this argument by first contextualising the issue of investigating profession practice in the uncertainty of the world of work. The three main approaches to practice research are then discussed, examples of their use are offered, and their limitations identified. The chapter closes with a discussion of how critical realism can give transdisciplinarity a philosophical underpinning and offer a way forward. This approach is not methodologically separate from the three previous approaches. Indeed, it advocates their technologies, but within a richer context than a problematical mono reality. In doing so, it raises concern at the growing acceptance of mixed-method approaches as an epistemic device to resolve issues of validity, since what is at issue is the limitation of the forms of knowledge that they reveal, not the method itself.

10.2 The Context—The Work World

The points we need to address when considering the nature of professions or occupations are complex, often transdisciplinary, and usually messy. Our world is uncertain, and many of ways in which people learn need to be revisited when in the real world of work. This is clearly illustrated in the need for practical experience in all the professions. Getting professional practice right and understanding how this can be achieved is central to a sense of self-development and learning to become a professional. This has been conceptualised by Johnsson and Hager (2008) as ‘an embodied constructed experience with others in context’ (2008: 526), for it provides a point of departure in our understanding of being within a specific context: the workplace. As Kovacs (1986) comments, ‘work is an essential part of human life as recognized by all serious reflection on the value of human activity’ (1986: 195). As Shershow (2005) pointedly reflects, we see ourselves as ‘*working to live and as living to work*: understanding labour at once as inescapable obligation... and as the definitive essence of our humanity’ (2005: 13, emphasis in original). This phrase complements Arendt’s (1985) more dramatic distinction, where we ‘eat in order to labor and must labor in order to eat’ (1985: 143). Importantly, Dall’alba concludes that understanding of professional practice is central to how we both perform and develop that practice (2004: 679).

Specifically, professional practice within the professions, as well as in other workplaces, has an ontological intelligibility. This matters to the stance a professional takes on being a professional and being amongst others. Such practices are not conceptual but practical and, among other legitimising characteristics such as a shared knowledge base and moral code of conduct, call forth a way of being that treats clients not as objects for use through calculative expedient thinking, but as real and genuine entities in their own right. As Malinski and Bournes (2002) reveal in their review of the practice methodology used as a guide to practice within nursing,

a greater respect for clients' (patients') world view and self-determination of treatment leads to greater satisfaction with the provision. Dall'Alba (2004), amongst others (Webster-Wright 2010, or Edwards 2010), challenges the focus on detailed knowledge and skills as a base for professional practice and its understanding through performance, asking whether this is essential to the ontological development of a professional practitioner. This is particularly relevant to professional practice (Hager 2011) and sets it apart from everyday activities such as shopping or catching a train. It is more than activity; it has an associated moral good as well as a corpus of knowledge and expertise that needs to be attested to before, and often during, professional membership. This seems to be the intention of MacIntyre's famous, specific, and often contested definition of practice as:

a coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realised in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excellence, and human conceptions of the end and good involved, are systematically extended. (1985: 187)

By new candidates' learning of physical and discursive practices, the profession's experiential practice creates a capacity for them to understand the collective ethos that a qualified participant commits to join. It is this notion of commitment, aligned with future intention to act as a member of a collective, that is demanded in order first to gain admittance and then to sustain membership of a group, association, profession or community of practice. It can be argued that, in joining such a community, individuals alter their assessment of their prudential values, not necessarily to forgo them but to reevaluate them by giving priority to the profession's principles.

To summarise, our world view is formed by the practices that we decide to disclose to ourselves and by those we disclose to others. Schatzki (1996) suggests that practice is 'a temporally unfolding and spatially dispersed nexus of doings and sayings' (1996: 89). This meaning differs from merely doing, which the 'Western philosophical tradition has opposed to theory: theory versus practice, contemplation and reflection versus doing' (1996: 90). Moreover, its potency is directly related to one's belief in oneself in the specific community of practice of which one is existentially part. It is how we understand the lived experience of the practices we adopt to gain recognition as community members. The role of learning in our community is a negotiation, by means of projecting an understanding of the workplace, to find a familiar and satisfying niche (Billett 2010). To reveal higher levels of knowledge, technique, and skill in practice does not need a university classroom or academic discipline, but a way of acknowledging higher levels of skill in practice. How and why we might do this is our next concern.

10.3 Ways of Understanding Professional Practice

There have been a number of contemporary methodological approaches to understanding the practice of research, each of which makes a contribution (e.g. Kemmis and McTaggart's five different notions of practice research (2005); Macpherson et al.'s

territory of professional practice (2006); and Green's edited collection on researching and understanding professionals (2009)). However, this chapter is guided by historically dominant discourses of research that continue to dominate current research practice: quantitative (loosely interpreted as positivistic), qualitative (loosely interpreted as interpretative), and pragmatic (again general conceived as mixed methods). Still more basic than these classifications is the inevitable connection between the type and the form of research questions that we ask and our philosophical frames of reference. The term 'discourse' recognises that language, themes, dominant messages, and interpretations frame our ways of knowing, knowledge making, and acting in the world. In developing each of the following discourses: positivism, phenomenology, pragmatism, and the complex ideas of critical realism with transdisciplinarity research, their ontological position (that is, from a sense of subjective personal agency) as well as the epistemological (what can be taken to count as truth) will be considered. For example, a positivistic position assumes a realist ontology (one where a reality exists external to oneself and the task is to find what is this external reality and its universal principles). An interruptive approach assumes reality is what we perceive, not what actually exist beyond our perception, and a relative ontology assumes an external intransitive reality is sought, but the way in which it is understood is personal. In the following section, each of these views is discussed in the light of how they might reveal issues relating to professional practice.

10.3.1 Positivism: A Realist Discourse of Rule-Bound Professional Practice

Descartes (2006) devised three pillars of methodology by which to discover an infallible basis for a claim for truth; his methods are as much about empiricism as they are about *a priori* reasoning. These pillars are to:

- Never accept anything as true that is not incontrovertibly known to be so;
 - To divide all difficulties under examination into as many parts as possible; and
 - Undertake complete enumeration and such general surveys as to leave nothing out.
- (Based on Descartes 2006: 17)

This dependence on the deductive reasoning, completeness, and reductionism launches us into the logical positivist position on the tenets of validity and truth. Positivism is not a mono-theoretical approach but comprises diverse threads and related approaches such as empiricism, scientism, determinism, and reductionism. It asserts that the world is ordered and that this order is controlled through and by universal laws (such as the law of gravity). This approach applies to both physical and social science (Comte 1988), with the intent to identify these laws and how they apply and can be verified. The threads all follow a similar direction, leading to understanding the natural world through perceiving what can be taken to be existence, which was the core of the views of thinkers such as Descartes, Kant, Bacon, and Hume. The logical positivists argue that verification can only be through experience or through reasoning. The most celebrated engagement with the social sciences is, perhaps, Hempel's discussion in 'Logical Positivism and the Social Science' (2001).

In this essay, Hempel (2001) contended that ‘there is no fundamental difference in subject matter between the natural sciences and the psychological and sociological disciplines’ (2001: 255), a view echoed by fellow logical positivist, Carnap, who claimed that ‘all laws of nature, including those that hold for organisms, human beings, and human societies, are logical consequences of the physical laws’ (cited in Hempel 2001: 267). Here there seems to be a problem, for professionals do not make decisions in their professional world without engaging with it, in a parody of cold, detached intelligence. We simply do not determine our action is such a logical, detached way.

Perhaps more than any other, Popper (2002) is responsible for sustained criticism of the logical positivist discourse of knowledge. His criticism is based on a notion of demarcation between the natural sciences, which are resolved through inductive logic and verification, and metaphysical speculation. This led to an assertion by the logical positivists of the Vienna Circle that only those questions susceptible to empirical confirmation or refutation are scientifically meaningful. Questions relating to the unseen—emotions, values, ethics; those motivational but hidden aspects of our lives—are inferences and, whilst acknowledged as able to affect behaviour, were thus not susceptible to scientific enquiry. Indeed, the positivists argued that induction, the most common form of inference, could never lead to successful verification. This is because, Popper suggested, ‘there is no such thing as induction’ (2002: 19), because one can never be certain of inference. Rather, one should look for correction. This led to his notion that the purpose of science is the falsification of theories. He argues that what characterises the empirical method is its manner of exposure to falsification: the system has to be tested in every conceivable way (ibid.: 20). Rather like Peirce (1998), Popper (2002) felt that induction was associated with conjecture at best, and at worst with guessing. This leaves empiricism not without merit, but without any status based on deductive reason. The best induction can contribute is collaborative agreement regarding existing hypotheses or, more substantively, refutation of a hypothesis. Popper’s logical positivism shares with positivism an assumption that a single reality exists that is external to the observer, but it is much more nuanced in its truth claims: truth is not absolute, but probabilistic and provisional. For instance, in professional practice much which is learnt in the classroom fails in the world of application. This is the reason for experience of practice and exposure to the messiness of nursing, courtroom dramas, and dealing with audit clients. Moreover, different interpretations of anything other than the most atomistic involve a range of observers whose ontological positions may be influenced by the theories that inform their observations.

Such concern about the neutrality of observation, upon which the forms of logical positivism rest, begs a number of questions related to how this neutrality can function in the real world of data collection to support a case for collaboration or refutation. This is at the core of the legitimacy of evidence-based practice that is so much at the forefront of policy on professional bodies. These are important questions for evidence-based practice (Hammersley 2005; Biesta 2007; Boaz et al. 2008; Kvernbekk 2009). When identified as grounds for formulating practice, ‘evidence’ is commonly assumed to be assured; that is, the evidence was created or based on

an empirical approach rather than on judgement, expertise, and experience. Such a position leads to a question of how reliable, as distinct from how valid, are positivistic approaches to investigating practice.

The hegemonic cultures and discourses of positivism remain dominant, if a little camouflaged (Kincheloe and Tobin 2009). Giroux (1997) argues that these objectivist forms of research and knowledge work have produced a 'culture of positivism' that accounts for the range of reductionistic and dominant ideology-based epistemological practices that continue in contemporary research. When researching professional practice, cultures of positivism convert the complex, messy, axiological, instinctual, emotional, and embodied nature of professional agency into procedural, behaviouristic, and skill-based discourses. Positivism's function, then, engenders control over matters of judgement and propagates grounds for the craft of the profession to be measured in technological ways.

Examples of such research practices are:

- Wastell et al.'s (2011) experimental approach to probing practice cultures, and for examining different patterns of professional sense making in social work practice.
- Stes et al.'s (2010) study using a quasi-experimental design of the impact of an instructional development programme for beginning university teachers on their teaching approach.
- Hoe and Hoare's (2012) critical appraisal of evidence-based practice in nursing professional development.

Zins and Murphy's (2007) report on the results of an exploratory national survey of school psychologists' involvement in peer support groups, undertaken to identify the potential contribution to improving professional practice.

In summary, positivism assumes a view of reality and of our place in it that seeks determination, neutrality, and control. This is best found in the closed system of an experimental environment, with control variables and an unchanging context, so that verification can be checked by repetitions. The real world is not like that. Although we can adopt methodological techniques from this tradition for use in the social science where appropriate, they clearly need caution. It may be well and good to know how many hours teachers take to prepare their classroom practice on average but, without knowing their reasons for doing this—their educational philosophy, their pedagogical approach, and their reason for teaching—it offers very little besides description and grounds for speculation. The next discussion is more open to interpretation.

10.3.2 Phenomenological Discourses, Perceiving the Essential in the Commonality of Practice

Positivist, measurement-oriented, and rule-governed discourse is, according to Avis, a form 'unsuitable for investigations of the emergent and constructional aspects of intentional human social behaviour' (2003: 996). This standpoint assumes

a distinctive understanding of the existential, emotive, embodied, non-theoretical, and situational nature of. Moreover, in van Manen's opening to his 1997 paper, 'From Meaning to Method', there is a strong and unambiguous connection with phenomenological research into profession:

the reason professionals remain intrigued with human science inquiry is that it is a science of plausible insight, speaking not only to our intellectual competence but also to our practical intuitive capabilities. Good phenomenological texts have the effect of making us suddenly see sometimes, in a manner that enriches our understanding of everyday life experiences. (1997: 345)

Furthermore, from the perspective of Husserl (1983) (generally recognised as the originator of phenomenology), this method of inquiry aims to exemplify the essence of an experience in a wide range of forms, either indirectly, as others might perceive it, or directly to uncover the intent behind the experience. Intent is what we intend, or perceive, as a purpose. It is an order relationship when we perceive things: a knife for cutting; a code of conduct for reference to acceptable professional conduct; an exciting read for a train journey.

From Husserl (1983) and Schutz (1967) via Heidegger (1962) to Arendt (1985), Derrida (2004), and Ricoeur (1981), the phenomenological approach is about thinking of experiences. It is an unconcealing of that which our ways of being have hidden in the unconsidered practices of our everyday, lived experience. Husserl's (1970) extended discussion of the world in which we perceive ourselves—our lifeworld—argues that the concept of scientific procedure has its roots in the lifeworld, amongst other things, and 'sets itself the task of transposing knowledge which is imperfect and pre-scientific in respect of scope and the constancy into perfect knowledge' (1970: 110–111). It is a world marked by the culture of Enlightenment and one where subcultures ought to be avoided (Luft 2011: 356). This Husserlian idea of the lifeworld (basically the world as we experience it as a coherent context for our agency) is common currency in social thought, thanks mainly to Schutz (1967). Pettit has developed Schutz's role analysis of the lifeworld, arguing that it presents six linked problems for the study of how people understand one another: 'the problems of the interpretability, explicability and justifiability of belief on the one hand, behaviour on the other' (2011: 260). This approach relies heavily on a theory of individualism where, as Pettit states, 'epistemological individualism leads naturally to an ethical individualism—specifically, to an existential exaltation of individual creativity' (2011: 266).

In a professional context, Sandberg and Dall'Alba (2009) describe the lifeworld's main features in terms of organisation. These constitute the key unfolding aspects of a lifeworld perspective, namely an 'entwinement with world, ways of being, lived body, being with others, and equipment' (2009: 1355). Their work is not cast in Husserlian terms, but inspired by Heidegger and Merleau-Ponty who, together, provide the phenomenological framework for an investigation of the phenomena of professional practice within a lifeworld perspective, 'where human beings are seen as constantly engaged in performing a range of activities that belong to their practice worlds. These activities are guided and directed by a sense of purposefulness

and agency' (2009: 1359). And, through Husserl and Schutz, inevitably we are led to a form of individualism that hampers our understanding of our functionality in a web of familiar practices.

The lifeworld differs from Heidegger's (1962) work-world of practice, where the world is determined by how its objects are recognised by our using them for specific purposes (see Gibbs 2008). Heidegger argues that the meaning of our actions is understood in terms of 'the background practices on the basis of which all activities and objects are intelligible or make sense' (Dreyfus 1992: 223). Research is thus an understanding, and we understand our world without noticing background practices. It is only when we conspicuously concentrate upon these practices, as when we apply a methodology to reveal them, that they are shown in terms that our understanding experiences as being-in-the-world in a certain way. The work-world of practice has a familiarity defined by its function. For example, the accountant world is one of financial accounts, business plans, and tax returns—not usually of Latin translations or stand-up comics. For the lawyer, it is of criminals, innocence, and juries. In this world, the lawyer does not see people as humanity but as actors in his world of law. This familiarity becomes the 'presupposed basis of any thoughts [which] are taken for granted and go unnoticed, and because in order to arouse them and bring them into view we have to suspend for a moment our recognition of them' (Merleau-Ponty 1962: xiii).

A phenomenological analysis of practice does not examine the specific elements of an experience, but the qualities of that experience and how they affect being, as a form of hermeneutical interpretation. The logic of this practical awareness is distinct from and, not reducible to, formal logic. It is practical. This practical logic is a 'logic that is intelligible. Coherent but only up to a certain point (beyond which it would no longer be "practical"), and oriented towards practical ends, that is, the actualization of wishes, or desire (of life or of death), etc.' (Bourdieu 1998: 132). It understands only immediacy of action and 'excludes attention to itself' (ibid.: 92). This applies to modes of knowledge that cannot be translated into conceptual and theoretical representations, but are 'corporeal, relational, temporal, situational and actionable knowledge' (van Manen 2007: 22). The insight of practical logic together with the temporality and tempo of practice is perhaps the major contribution to the phenomenology of practice that Bourdieu's habitus (our lifestyles, cultures and expectations) can offer us (1977, 1998). For Bourdieu, 'practice is inseparable from temporality, not only because it is played out in time but because it plays strategically with time and especially with tempo' (1977: 81).

To summarise, our world view is formed by the practices that we decide to disclose to ourselves, and those we disclose to others. These are often hidden from us by their everydayness; we just do them. To research these practices we must identify them and make them conspicuous through a praxis of searching and re-searching. In many professional fields such as pedagogy, law, nursing, and accounting, the dominance of technological and calculative thought is so strong that the presupposition of instrumental structures that grounds professional practice effectively hides the ontology of being such a professional. Through questioning and interpretation, through hermeneutics and narratives, the experience of being a professional

can be revealed. Those insights gleaned from how a professional sees her practice are, of course, personal. Because each professional has similar training in their profession, by using a phenomenological approach we can infer certain similarities but, at its core, it is about experience of the world that is personal; a world that is real only in the mind of the professional. The approach is often contrasted in this way with the external reality of the positivistic approach described in the previous section, but there is a blend possible and this is provided by a pragmatic perspective, discussed next.

Examples of phenomenological research practices are:

- Lee's (2009) investigation into professional doctorates and the transformation from an autonomous scholar into an enterprising self through reflection and reflectivity.
- Webster-Wright's (2010) phenomenological study of professional learning as a self-directed activity and intentionality.
- Johnsson and Hager's (2008) examination of the nature of learning, discovered by recent graduates participating in a symphony orchestra-initiated development programme designed to nurture them through the transition to becoming professional orchestral musicians.
- Hoskyns (2011) introduces the particular value of focus groups for music therapy research, highlighting their suitability for exploring 'real-life' practice issues.
- Paloniemi and Collin's (2012) data for their study is derived from a collective ethnographic research project focusing on surgical workplace learning and professional identity. The paper illustrates the manifestations of discursive power through three selected episodes.
- Fenwick (2012) presents interview-based research into the participation of older professionals and participation in learning and their understanding, through stories and practices, of knowledge, and themselves as knowledge workers.

10.3.3 Pragmatism: A Discourse on What It Is Feasible to Believe

Pragmatic philosophy argues that judgement about truth and morality is not a matter of mental processes or facts of consciousness, but is grounded in intersubjective practices and symbolic systems. In other words, we agree what warrants our trust and take it as trustworthy until there is evidence enough to suggest a better alternative. As such, it has roots in positivism but rejects notions of reductionism in favour of experience; of agency in the real world. For Peirce, the establishing truth is a foundational, normative, and rational discipline (1998). James sees truth as what is good in the way of belief (1968), while Dewey takes it to be what we are justified in believing, in the sense of a social phenomenon (2006). The neo-pragmatist, Rorty, argues that truth derives its legitimacy from a given social group (1982).

Early pragmatism tends to be portrayed as an American movement vitalised by Peirce (1998), James (1968), Mead (2002), and Dewey (2006). Their contributions

are to many of the social sciences. Mead's legacy lies in social psychology and social theory, Dewey's influence was on educational theory, James' on psychology, and Peirce's in contemporary Critical Theory. Often unmentioned in this gathering is the significant contribution from the Oxford philosopher, Schiller, whose essay on humanism was published in the same year as James' own 'What Pragmatism Means' (2007) and much admired by him. Indeed, the early 1900s were landmark years for pragmatism for, in the same year, Peirce's (1998) attempt to clarify its hazy meaning appeared as 'What Pragmatism Is' (1998). Historically, pragmatism is a strangely compelling mix of scepticism, especially of logic and empiricism, with no recourse to metaphysical precondition. Meaning is what we take it be or, as Rorty suggests, it is verifiable belief.

Dewey, especially, contested the notion of experience either as an accumulation of knowledge or as a dialectic transactional examination. In this sense it is not 'trial by error', but informed experimentation where the environment blurs subject and object. This notion of experience led Dewey to develop an understanding of inquiry activated by a rupture of the status quo. A rupture is first felt emotionally and developed through a process of hypothetic base inquiry. The results of inquiry are not radical changes in the state of one's understanding but an evolution, a change where premises are questioned and circumstances tested. This process is undertaken with the concepts, theories, and the experiences we have at hand. It is facilitated by theory and concepts, as they offer alternative ways by which others, be they teachers or craft masters—professionals—can help to provide new ways for learners to understand what they are experiencing. Learning thus is not solely about action, but about a reflection on concepts, theories, and experience. Experience thus provides a platform for building a view of the future, not an epistemology based on what has happened but on what might happen, with education a way of communicating what one has learnt. Rorty, it can be seen, calls this 'pedagogy' (1999) and, for Dewey, it is a process of anticipatory imagination. Moreover, such a view holds that what is known is provisional, fallible and correctable. Schiller offers the example of the abstraction of arithmetic when he argues that 'two and two make four, is always incomplete. We need to know to what "twos" and "fours" the dictum is applied. It would not be true of drops of water, nor of pleasures and pains. The range of application of the abstract truth, therefore, is quite limited' (Schiller 2009).

Dewey's approach gives the inquirer the role of an active agent of knowledge creation, testing it against the context in which it was rationally and socially constructed or adopted. His argument with propositional knowledge has its roots in the work of Aristotle (1995) and the more recent philosophies of Kant (2007), Merleau-Ponty (1962), Heidegger (1962), Bourdieu (1977), and contemporary approaches to learning and knowledge by post-structuralist thinkers such as Derrida (2004), Lyotard (1984), Foucault (1980), and Winch (2010). Often quoted as a significant but not an unchallenged contribution is Ryle's development to epistemology, in that we 'know' in two modes: both 'know how' and 'know what'. Moreover, Polanyi's (1966) insight is his acknowledgement of tacit as well as explicit knowledge as a legitimate notion, mediating what is done in practice. This pragmatic position has much in common with that of the early phenomenologists and the focus on

reflection is taken up in Schön's (1984) seminal text, *The Reflective Practitioner: How Professionals Think in Action*. It has become important in practice-based professional learning, where the field of study is the professional's own practice. Rather than formal external knowledge transfer, it comprises reflection-on and reflection-in-action.

Pragmatic philosophy has been selectively drawn upon by two major and competing lines of theoretical development to support their contemporary claims for practice. In Habermas' view, it has given up on the rational and emancipatory core of modernity and has been directed against the neo-pragmatism represented by Quine's (1953) and Rorty's postmodern scepticism, a competing strand. On the opposing side, Rorty argues for a non-foundational pragmatism that, unlike classical pragmatism, does not view science as the first and final site for reason and social progress. Going against widespread claims for foundational reason such as Habermas' universal pragmatics, Rorty is sceptical of the attempt to find the single, reliable method for reaching the truth about the nature of things. Although Quine's pragmatic epistemology acknowledges verification based on reductionism and the dogmas of analytical and synthetic truths, it also acknowledges that in 'abandoning them is... a blurring of the supposed boundary between speculative metaphysics and the natural science. Another effect is a shift towards pragmatism' (1953: 20). This does not provide a secure foundation for empirical epistemology.

Rorty discusses this as a concern for commensurability. Taken to be against epistemology and in favour of conversation, his approach is outlined in *Philosophy and the Mirror of Nature* where he states 'the rules which constrain inquiry, are common to all discourse, or at least to every discourse on a given topic. Thus epistemology proceeds on the assumption that all contributions to a given discourse are commensurable. Hermeneutics is largely a struggle against this assumption' (2009: 315–316). This represents a rebuttal of scientific method: 'if the core of pragmatism' is to 'attempt to replace the notion of true belief as representation of the "nature of things" and instead to think of them as successful rules of action, then it becomes to recommend an experimental, fallibility attitude, but not to isolate a "method" that will embody this attitude' (2009: 65–66).

Our truth claims, then, are a matter of whether our beliefs 'provide reliable guides to getting what we want' (Rorty 1999: 33). As Baert (2004) points out, researchers following Rorty are asked to commit themselves to a theoretical framework supposed to 'guide' or 'inform' the research. Being 'guided' or 'informed', unfortunately, often implies a blinkered way of seeing things, reading the social context in order to reinforce the very presuppositions that fuel the research. Rorty's neo-pragmatism steers the approach away from its original conception of inductive truth through empiricism. He breaks with the constraints of a hegemonic notion of epistemology that is intrinsically linked to the validity of the natural sciences and liberates the understanding of inquiry through a conversation of liberation and plurality. Yet, as Bhaskar (1989) points out, Rorty's view is susceptible to a Kantian critique: the tension between empirical selves and moral agents conflates a discourse of reality that ought, by rights, to separate an ontological and an epistemological notion of scientific truth.

In summary, pragmatism is a rationale for knowing and acting within the lived experience of the profession. It provides answers to problems and cautions about universals and generalities. It provides evidence for rational belief and offers an exploration of professional behaviour that is deep and meaningful, and structured around meaning-making that makes calls upon methodologies of creativity. To understand a professional's practice, arguments of reality can be side-lined, along with notions of epistemology, and data collection becomes a process of using appropriate methods to resolve specific questions. The truth revealed can be checked by using different methods to illuminate the subject of the research in alternative ways. This permits triangulation of knowledge and creates confidence in the findings of the research.

Such approaches are classified in the research literature as mixed or pragmatic methodology (see Creswell 2008 for a clear application to practice). They have become very popular in social sciences and, as the examples below show, in the study of professional practice. However, they may be criticised for confusing the nature of the object being investigated to benefit the outcome. In so doing a deep understanding is lost and future developments hampered. By introducing a meta-theory to support a transdisciplinary approach, the next section confronts this issue.

Examples of mixed methods research practices are:

- Bifano's (1989) study into understanding the leadership practice of the elementary school principal, suggesting a mode of leadership behaviour that may lead to increased professional effectiveness.
- Eraut's (2007) longitudinal study of early career professional learning, focusing on the first 3 years of employment of newly qualified nurses, graduate engineers seeking chartered status and trainee chartered accountants. It uses observation and aggregation of data, and is triangulated with interviews. This furthers the study (2011) on mid-career professionals, when Eraut revealed that informal learning was perceived by the professionals as work, not learning, using the same methodology.
- Caitlin and Sutton's (2009) investigation of the emotionality of teaching, especially when teachers must change their practice. Past research on emotions and change in the general population has been predominately quantitative, whilst that of teachers' emotions has been mostly qualitative. To draw on both these approaches, the study used a mixed methods approach.
- Sims' (2011) findings from a mixed methods study with practitioners qualifying on joint training programmes in learning disability nursing/social work, exploring the impact of such programmes on professional identity. The study reported in this article comprised a postal survey to graduates from five programmes, followed by in-depth, semi-structured interviews.
- Kolehmainen et al.'s (2010) review of the literature on individual community professionals' caseload management (behaviours related to assessment, treatment, and discharging of clients). This was to identify the main themes and concepts, and to synthesise the findings to inform practice, policy, and research. Qualitative and descriptive quantitative methods were used for data analysis and synthesis.

10.3.4 Transdisciplinarity Discourse: A Critical Realist Investigation of Professional Practice

The final approach discussed in this chapter is critical realism, which is contextualised within boundary-spanning definitions of transdisciplinary research that attempt to resolve value-laden issues requiring judgment of practical alternatives that affect others. However, given the ambiguity and ambition of transdisciplinarity, it is not surprising that a variety of interpretations abound. Finding an all-embracing definition shows Deleuzian multiplicity in its difficulty (see Pohl and Hadorn 2007; Lawrence 2010; Nicolescu 2010; and Klein 2010, as the most quoted authorities). Nevertheless, rather than focusing on the delineation of the approached offered, an analysis of these contributions points to consensus over which problems benefit from a transdisciplinary perspective. These tend towards the:

- Complex and heterogeneous
- Specific, local and uncertainty
- Epistemologically seeking satisfying explanations that enable and warrant, and improve our ability to seize opportunities
- Involving practical action for the good of, and through, others.

The study of professional practice, and of the practice of professionals, is often complex and takes place in open systems of social engagement rather than the closed systems of experimentation. Transdisciplinary knowledge is found in the liberation of reason from formality and in the multi-realities (see below) of the presenting problem. To seek such insights often requires collaboration, contextualisation, and reflection leading to reasoning that is a collective, ethical, problem-based ‘explanatory’ engagement. None of the three previous approaches offers an adequate meta-theoretical approach that allows a complex and layered praxis of practice to be usefully described, yet critical realism provides such a footing to discuss transdisciplinary research. The advantage over the previous meta-theories is that, whereas the empiricism of the logical positivist presupposes a regularity or law-like quality to practice, and the hermeneutics approach of the phenomenologist is constrained by existence outside the life-world, the critical realist includes both. Moreover, structuring reality rather than assuming the mono-reality of the pragmatists builds a more fluid conceptualisation of practice research, which allows for a re-conceptualisation of the research problem in a layered way.

There will be no attempt to repeat much of underlying philosophical grounding of critical realism, which owes much to Bhaskar and which is adequately summarised by Easton (2010). It is sufficient to state that Critical Realism offers an ontology that can conceptualise reality, support theorising, and guide empirical work to find adequate explanations. Easton suggests that ‘(C)ritical realists accept that there are differences between the empirical, the actual and the real, and that data are collected from people as well as from, and about, material things. As a result they accept that any explanations are necessarily fundamentally interpretivist in character’ (2010: 124). Pivotal to this approach is Bhaskar’s (1979) stratified ontology: layers of the

empirical, the actual, and the real. Each offers interpretation in a structured abductive approach and it is this that makes the approach offered here different, in that it implies that imagination and mystery explain transdisciplinary problems and, with them, the context to act.

According to Danermark, the five features of a critical realist study are (1) a stratified ontology, (2) an intransitive dimension of reality, (3) causation in terms of generative mechanisms, (4) the importance of contextualisation, and (5) the empirical reality. The stratification of reality we have previously mentioned as real, actual, and empirical. It helps us to accept both a reality outside of ourselves and a personally constructed engagement. Each reality is nested in the next and means that entities in external world exist without our perception of them. (They are intransitive, whilst those that exist only when we are concerned with them are termed transitive.) This applies to both social structures and entities within them. The power that they have to shape our world is within their generative mechanism. They are things that are not seen but structure our practice within the world, such as the market mechanism or climate change. Contextualisation is layered and integrative and it includes the case of professional practice mechanisms such as the psychological, socio-economic, cultural, and normative (personal identity, the economic and social power of the profession, its standing in society, and the values it is expected to uphold).

The final element, the empirical reality, is developed in six stages (Danermark et al. 2002: 109–111). The model begins with two process of disruption, from which flows an analytical resolution. Stages 3 and 4 begin to introduce the notion, with an abduction phase followed by retroduction (see below). Danermark et al. (2002) accept some blurring of these stages in actual research practice and it is this imaginative approach to re-description and interpretation prior to theory development, abstraction, and contextualisation that is relevant here. Danermark et al. (2002: 80) differentiate abduction and retroduction as follows:

- Abduction is to ‘interpret and recontextualise individual phenomena within a conceptual framework or a set of ideas. To be able to understand something in a new way by observing and interpreting this something in a new conceptual framework’.
- Retroduction is ‘from a description and analysis of concrete phenomena to reconstruct the basic conditions for these phenomena to be what they are’ (ibid.).

Bhaskar and Danermark (2006) developed this approach when investigating the practice of professionals in the field of disability. They claim that such an approach indicates more clearly ‘than the other positions the appropriate direction and context of explanatory research—from the manifest phenomena to the mechanisms that produce them, in their complex co-determination’ (2006: 280). According to Bhaskar, this will necessitate:

epistemological transdisciplinarity, involving the exploitation of pre-existing cognitive resources drawn from a wide variety of antecedent cognitive fields in models, analogies, etc. Such transdisciplinarity in creative interdisciplinary work has seemed to some writers to involve breaking with the very notion of a discipline, to the extent that there has been talk of postdisciplinarity. (2010: 5)

The central claim here is that there is a difference between retroduction and abduction, which makes this approach distinct.

For example, a critical realist investigation into the professional development of lawyers would require a layered approach to the reasons for personal development as an identified professional. The sub-cultural aspects of the development are the hegemony of the professional structure of the profession and the importance of professional development as a societal sign of confidence (or reconceptualised in any other societal engagement) in the profession, and engagement with the legal system as a whole and the role this plays in entrusting its democratic values to a select group of people. Having described the research problem as such, then one would need to reconceptualise what professional development might mean in this layered context and consider ways in which its multi-layered purpose might be investigated. At that stage, one would consider how the differing reality layers could be disclosed and what techniques would best be able to offer understanding of the causal powers that derive the form and content of professional development programmes: accreditation, assessment, exclusion, and cost.

Clearly, not all problems concerning professional practice lend themselves to this approach to research. It is an approach that is best suited to the rubric of case study methodology and good examples are provided in two collected works of transdisciplinary case studies, edited by Hadorn et al. (2008) and Brown et al. (2010). The insights for transdisciplinary action are based on readiness to see within a problem a reality that may be concealed by a disciplinary lens. This moment of vision is the origin of the abductive process of creatively and imaginatively considered ways of understanding the presented problem or changing its definition. This insight is identified within the abductive case study and triggers the processes of retroduction by presenting it as reasoned through phronetic abduction. The wise decision is the responsibility of the investigative team and the need to move ‘towards the “exemplary knowledge” of abduction and phronesis’ (Thomas 2010: 578). As Thomas concludes, we are ‘left with a view of case study’s validation coming no longer through reference to a body of theory or generalized knowledge. Its validation comes through the connections and insights it offers between another’s experience and one’s own’ (ibid.: 579). Thomas justifies case study as a process of empathy, of understanding the other person’s perceptual horizon, and advocates an ‘anatomy of narrative’ approach. Helpful though this method may be, it seems its insights to some extent bracket off the case study from the world in which it exists. This positioning statement has resonance with what is advocated in Flyvbjerg’s (1998, 2001), Flyvbjerg et al. (2012) phronetic method and the ‘thick’ analysis of the details of a phenomenon from which more general insights can be gained (see also Thuesen’s 2011 discussion of phronesis and the handling of elite interviews as a way of dealing with power and reluctance in interviewees). Transdisciplinary case studies do not seek theoretical validation, but a means to a satisfactory understanding of deep and complex problems and then their solution. Critical realism offers both a meta-theory and a form of investigation.

Examples of such research practices are:

- Easton’s (2010) description of the critical realist approach of Sayer and development of its general application to case research. An example of its use in practice

is presented using the case study of the development of the buyer–seller relationship after the installation of a new MIS system.

- Blom and Morén’s (2010) presentation of a conceptual framework and a theoretical model, helping us explain the way results in social work practice arise from the content of interventions and its contextual contingencies.
- Pohl’s (2011) querying what is progress in transdisciplinary research, where several disciplines and further societal actors may be involved.
- Kavanagh’s (2013) outline of a phronetic paradigm for organisational inquiry, concluding by briefly examining the implications of such a paradigm for research and learning.

10.4 Concluding Comments

This chapter engages with ways of understanding the practice of professionals as it emerges and can be understood. It takes a route from positivist realism ontology through the critical world experienced by the phenomenologists, to the warranted beliefs of the pragmatists, and rests with the insight of the critical realists. It ends with conversations concerned with transdisciplinarity and the replacement of epistemology with phronesis as the goal of understanding the practice of professionals. Along the way, appropriate uses of methodologies are identified and examples of these approaches abound. These have been mentioned in concluding paragraphs at the end of each section. It is now the time to try to pull together our concluding thoughts.

In moving to examine a variety of contrasting approaches to researching practice, a major limitation soon rears its head. It is apparent from examination of the contrasting paradigms to examine practice that the truth of any claim for knowledge that may emerge from particular forms of research is entirely dependent upon the paradigm used. And, from the perspective of the agency involved in research, it has been argued that one needs to be reflexive in examining the culture, and often the hegemonic forms of culture, of such agency to gain some understanding of the research, its approach to the collection, archiving, and analysis of data, synthesis of evidence, and the form of knowledge claims that are disseminated about practice. But what has complicated the matter still further is the multiplicity of understandings that actors involved in the process—researchers, practitioners, and other related agencies—have about the very nature of researching practice itself; both the materiality of its unfolding at the workplace and the multiplicity of discourses mediate such practice. Nor does the move towards transdisciplinary forms of inquiry about practice appear to provide ready-made solutions to the many concerns identified earlier in the chapter about researching practice.

There is a need to emphasise, however, two strong themes from this review of some of the paradigms involved in practice-based research in the workplace. These are the virtue of phronesis or practical wisdom concerned with researching practice, and the intentional structure of such research. It has been argued that the precise

locus for the exploration and examination of these two themes is that of the collective action of researching. From the very limited studies of such collective forms of action, it is clear that we are now standing on the frontier of what is done in researching practice.

In seeking to attain new horizons for researching professional practice, this chapter has argued that there is considerable merit in examining further the implications of research approaches to professionals and their practices. In particular, the chapter has provided a review of the most popular research approaches used to investigate professional practice and suggests that there is considerable value in researching practice that involves the interplay of critical realism and transdisciplinarity as forms of inquiry. Both these, it has been argued, pose the challenge of transcending, transgressing, and transforming extant forms of practice-based inquiry and the outcomes of such research. Perhaps future research is warranted on the discourse of practice in the open systems of praxis. In this way, it is suggested, the very practice of research becomes laminated, to use Bhaskar's term. The assumption of one reality, so vital to the other research approaches discussed in this chapter, is forsaken for a more complex and rich conceptualisation of a three-level reality. Conceiving the possibility of understanding afresh what is practical practice and the wisdom of those who have professional mastery becomes a more holistic enterprise. Such an approach does not reject out of hand the tools for data collection developed by varieties of positivism, nor does the notion of pragmatic triangulation. Rather it structures, reconceptualises and combines knowledges to offer a coherent picture of what practice is, how it works, and what are the constitutive parts of its emergent power.

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Chapter 11

A Phenomenological Perspective on Researching Work and Learning

Gloria Dall’Alba and Jörgen Sandberg

Abstract Conventional research approaches typically conceptualise learning within and for work in terms of two separate entities: subject and object. More specifically, the individual subject who is learning is considered to be independent of the work to be learned. In contrast, practice-based approaches commonly emphasise the relation, rather than separateness, of subject and work. In this chapter, we engage with phenomenology in extending previous accounts of learning within and for work by bringing to the fore the manner in which practice is constituted through the *entwinement* of life with world.

We elaborate a lifeworld perspective on researching work-related learning, which challenges the ontological assumption of a subject-object constellation in significant ways. This challenge is pertinent whether subject and object are seen as independent of each other (as in conventional approaches) or as becoming related during performance of work (in several practice-based approaches). We explore how entwinement with world makes learning possible, while pointing to ways in which a lifeworld perspective affords novel resources for informing and enhancing research on learning within and for work.

Keywords Lifeworld • Phenomenology • Entwinement • Work-related learning

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11.1 Re-examining Research on Work-Related Learning

A central question for all research on work-related learning (and human learning, in general) is how to define learning. Our understanding of what learning is informs what to investigate, how to design our research, what empirical material to collect, and how to analyse and theorise learning within and for work. In other words, researching work-related learning presupposes assumptions that enable us to conceptualise learning *as* something in the first place. Conventional research approaches typically conceptualise learning within and for work in terms of two separate entities: subject and object. More specifically, the individual subject who is learning is considered to be independent of the work to be learned.

While this dualist ontology has been questioned in various ways over the years (see, for example, Dewey 1938; Packer and Goicoechea 2000; Prawat 1998; Semin and Gergen 1990; van Manen 1977), a growing number of practice-based approaches has intensified this critique during the past two decades (Billett 2001; Engeström et al. 1999; Gherardi 2006; Lave and Wenger 1991). The main criticism has been that work-related learning cannot be meaningfully understood when subject and work are regarded as two independent entities. This is because key aspects of work-related learning only manifest themselves in the practitioners' engagement with their work, that is, in their actual work performance (Billett 2010; Nicolini et al. 2003). Therefore, practice-based approaches commonly emphasise the *relation* rather than separateness of subject and work. Through this reconceptualisation, practice-based approaches have advanced our understanding of work-related learning in important ways. In particular, practice-based approaches have contributed new and more precise accounts of how work-related learning occurs in practice and how this learning can be appropriately evaluated (Billett 2010).

However, in reviewing contemporary practice theories in social sciences, Andreas Reckwitz (2002) concluded that these theories are fragmented and in need of more systematic elaboration in order to provide a powerful alternative to prevalent social theories. Perhaps contributing to this fragmentation, common practice approaches draw on a combination of philosophical and theoretical traditions, such as phenomenology, Marxism, pragmatism, Lev Vygotsky's social constructivism, and Ludwig Wittgenstein's later philosophy. A majority of these approaches, however, are inspired by the notion of the "lifeworld" in phenomenology, as the practice turn is tied to an interest in the "everyday" and, in particular, to people's "doings" in their everyday world (Reckwitz 2002). Although many practice-based approaches have been inspired by the notion of the lifeworld and have used related concepts, they have not necessarily adopted this perspective consistently throughout the research (Sandberg and Dall'Alba 2009).

In this chapter, we engage with phenomenology and propose a lifeworld perspective on learning within and for work. We outline the origin of the concept of the lifeworld and sketch some of its later developments, as a means of contextualising and elaborating a lifeworld perspective for researching work-related learning. A lifeworld perspective challenges the ontological assumption of a subject-object constellation in significant ways. This challenge is pertinent whether the subject and object are

seen as separated (as in conventional approaches) or as becoming related during the performance of work (in several practice-based approaches).

From a lifeworld perspective, learning is made possible and circumscribed by a way of existing that is more basic than the subject-object constellation, namely, what Martin Heidegger (1962/1927) called being-in-the-world. This notion stipulates that subject and world are not primarily separated, but that we are *always already entwined with others and things* in the context of specific practice worlds, such as teaching, occupational therapy and plumbing. In other words, it is our inevitable entwinement with specific practice worlds that makes learning possible. In this chapter, we argue that a lifeworld perspective enables us to extend previous accounts of learning within and for work by bringing to the fore the manner in which socio-material practice is constituted through the entwinement of life with world.

The chapter is structured as follows. We begin by describing the main features of the dualist assumption stipulating that work-related learning is defined by two independent entities, the learning subject and the work to be learned, which underlies conventional approaches. Second, we show how practice-based approaches have questioned this dualist assumption by emphasising the relation between subject and work, rather than their separateness. Against this background, we propose a lifeworld perspective on learning within and for work. Finally, we discuss some features of the proposed lifeworld perspective, which can advance research on work and learning. In particular, we endeavour to demonstrate that a consistent elaboration and utilisation of the notion of the lifeworld enables a more comprehensive and closer examination of learning within and for work than we see in much of the work-related research to date.

11.2 Dualist Ontology: Subject and World as Independent Entities

The dualist assumption of an independent subject and work, which underlies conventional approaches to work-related learning (for example, see Berliner 1994; Boshuizen and Schmidt 1992; Collier 2004; Ericsson and Smith 1991), derives from a more general ontological assumption that “world” is comprised of independent entities with specific properties. The entity assumption forms the foundation for the conventional Greek-Western philosophical tradition in which “world” is seen as a totality of things that are externally related to each other (Inwagen 2001; Inwood 2000; King 2001). As Magda King expressed it, “when Greek-Western philosophy speaks of to be, it thinks of the is of a thing” (2001, p. 12). Saying that a thing *is* typically means that “things” such as trees, factories, teachers, managers, biotechnology really exist among other things, that they have a real presence in one sense or another, and that in combination they make up reality. Hence, the human world and all its inherent practices, such as architecture, political science and building construction, are seen as comprising a totality of things that are externally related to each other.

When the world is regarded as comprised of externally related entities, the dualist assumption follows that an individual subject is externally related to an independent world. There are subjects, on the one hand, and the remaining things in the world, on the other. As soon as we are born, we discover a world consisting of a myriad of things, both material and immaterial. In order to find our way in the world we, as subjects, constantly learn about these various things. As Sandra Bartky expressed it, “the subject, originally worldless and isolated from the object, somehow leaps out of its domain and is able, through its own intellectual activity, to appropriate, certify or otherwise ‘master’ the object” (1979, p. 217). In other words, from a dualist ontology, it is assumed that learning happens when an individual subject attempts to learn about independent things in the world. Work-related learning is assumed to occur, then, when an aspiring or experienced practitioner acquires specific knowledge and skills to be applied at work, with this application often taking place at a subsequent time. Within this conceptualisation, there is the practitioner, knowledge and skills to be acquired, and the work, each of which is distinct from the others. Hence, the dualist assumption underlying conventional approaches to work and learning leads to research that investigates the various procedures and activities an individual subject uses while learning (decontextualised) knowledge and skills to be subsequently applied at work.

11.3 Subject-Object Dualism Questioned by Practice Approaches

The “practice turn” in the social sciences (see, for example, Schatzki et al. 2001) has given rise to a broad variety of practice-based approaches to work and learning. These practice-based approaches examine the everyday doings of people and things in organisations, while also emphasising the broader social practices of which these doings form a part. Although drawing from a range of different philosophical traditions (for example, actor network theory, activity theory, Marxism, phenomenology, Wittgenstein’s later philosophy), a common theme in practice-based studies is the everyday world of practitioners; specifically, the way practitioners perform their work (Reckwitz 2002; Sandberg and Dall’Alba 2009). The strong focus on the performance of work has meant that many practice-based approaches have questioned the dualist ontology within conventional approaches to work and learning in important ways. In particular, advocates of practice-based approaches argue that by treating person and work as separate entities, conventional approaches overlook central aspects of what characterises the kind of learning and knowing involved in practitioners’ actual performance of their work (Lave 1993; Lave and Wenger 1991; Dall’Alba and Sandberg 2006; Sandberg and Pinnington 2009).

In contrast to conventional approaches, many practice-based approaches emphasise the *relation*, rather than the separateness, of subject and work as a means of researching and more fully understanding work-related learning. This is because when practice becomes the locus, learning and knowing are regarded as indistinguishable

parts of the performance of practice (Blackler 1995; Engeström 1993; Gherardi 2006; Lave 1993; Wenger 1998; Whittington and Vaara 2012). In other words, learning and knowing are not considered to be located within individuals, nor are they seen in terms of intellectual activity that drives behaviour. Instead, learning and knowing are seen to be performed within social practice. For example, as Davide Nicolini and colleagues argued:

knowledge and learning cannot be conceived as mental processes residing in members' heads; rather, they must be viewed as forms of social expertise, that is, as knowledge in action situated in the historical, social, and cultural contexts in which it arises and embodied in a variety of forms and media. (2003, p. 3)

Similarly, Jean Lave stressed that, “knowledge and learning ... cannot be pinned down to the heads or bodies of individuals or to assigned tasks or to external tools or to the environment, but lie instead in the relations among them” (1993, p. 9). Accordingly, rather than focusing on a subject acquiring decontextualised knowledge and skills for subsequent application, research on learning to engage in practice commonly conceptualises this process as movement from the periphery towards full participation in practice (for example, Atwell 2009; Billett 1999; Lave and Wenger 1991; Morell 2004). Knowing and learning are seen to occur as an integral part of practice. Given the focus on performing practice, this research is often located in workplace contexts where the relations are more readily apparent, rather than in formal education.

However, although practice-based approaches stress the relation between subject and object, several of these approaches are still captured by the very ontological subject-object constellation they criticise. While rejecting the dualist separation of subject and object, they typically conceptualise learning and knowing in terms of subject and objects that become related through human activities or during practice. For example, Richard Whittington (2006, pp. 618–623; Whittington and Vaara 2012) conceptualises the practice of strategy in organisations as consisting of three discrete entities (praxis, practices and practitioners) that come together through practice activities, even while emphasising the interrelatedness of practitioners and strategy practice. He proposed “a framework that can link together different subsets of the three core elements, according to the particular task in hand,” although he acknowledged “their ultimate membership of an integrated whole” (Whittington 2006, p. 620). Similarly, in a review of the situated learning theory generated by practice-based approaches, including activity theory (for example, Engeström 1993), the sociocultural approach (for example, Wertsch 1991) and the distributed cognition approach (for example, Hutchins 1995), Stephen Fox observed that this learning theory:

[in] its very *theoretical* attempt to transcend the division between abstract mind and concrete practices, replicates the dualism when it seeks to mediate the two (as in activity theory) and/or favours the abstract “mental” side of the dualism as all Hegelian attempts at transcending division through higher order *theorisations* must. (2006, p. 429)

In other words, while practice-based approaches regard subject and object as interrelated, several of these approaches continue to treat them as separate entities

that become related through practice. As a consequence, these practice-based approaches still operate within the subject-object constellation, albeit in a more sophisticated manner than conventional approaches to work and learning.

11.4 From Subject and Object to Entwinement with World

We now turn attention to engaging with phenomenology in proposing a life-world perspective on work and learning that challenges, in significant ways, the subject-object constellation underlying both conventional and some practice-based approaches. The notion of the lifeworld within phenomenology stipulates that subject and object are not primarily separated or become related through practice, but that we are *always already entwined with our world*. Interestingly, although many advocates of practice-based approaches have been inspired by the notion of the lifeworld from phenomenology (see, for example, Chia and Holt 2006; Schatzki 2002; Wenger 1998), they have not fully adopted this notion throughout their research on work and learning.

Several phenomenological thinkers, such as Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty, Jean-Paul Sartre, Hannah Arendt, Hans-Georg Gadamer and Alfred Schutz, have heavily questioned the ontological subject-object constellation prevalent in the social sciences. As Dermot Moran pointed out:

Indeed, the whole point of phenomenology is that we cannot split off the subjective domain from the domain of the world as scientific naturalism has done. Subjectivity must be understood as inextricably involved in the process of constituting objectivity ... there is only objectivity-for-subjectivity. (2000a, p. 15)

In other words, we cannot step outside our world to observe it as though we were impartial bystanders. We are implicated in our observations, as well as in our encounters with others and things. As Amedeo Giorgi formulated it, “objectivity is not possible without a subject, and subjectivity is not possible without an object” (1992, p. 7). Making an effort to be impartial presupposes entwinement. It is this prior, inevitable entwinement that necessitates the effort involved in distancing ourselves as we seek to achieve impartiality. Acknowledging the centrality of reconceptualising our relationship with world for phenomenology, Moran goes on to argue that “phenomenology’s conception of objectivity-for-subjectivity is arguably its major contribution to contemporary philosophy” (p. 15).

Phenomenologists use the concept of the “lifeworld” for capturing and highlighting how subject and world are inextricably related. This concept has its origins in the phenomenological movement (Spiegelberg 1982) and is common to the distinct branches of phenomenology that developed during the past century. While the concept of the lifeworld is attributed to Edmund Husserl, the founder of modern phenomenology, it has been expanded and elaborated by several other phenomenologists, such as Heidegger, Sartre, Merleau-Ponty, Gadamer and Schutz. Since each of these thinkers pursued a specific knowledge interest, there are not only commonalities in their conceptualisations of the lifeworld, but also some

differences and tensions. We outline the origins of this concept and sketch some of the later developments as a means of contextualising our own lifeworld perspective on work-related learning. As we draw primarily on Heidegger and Merleau-Ponty's concepts of the lifeworld in this chapter, we mainly focus here on their accounts, after briefly outlining the origins of the concept.

11.4.1 Husserl: Intentional Character of Consciousness as Entwinement with World

In a lifelong attempt to establish a secure foundation for scientific knowledge, Husserl provides a substantive critique of the assumption that subject and object are separate and independent of each other. In one of his later endeavours (Husserl 1970a/1936), he used the concept of the lifeworld to describe the everyday world with which we are unavoidably entwined through our lived experience. According to Husserl, the lifeworld is simultaneously my world and a world shared with others and things. He argued that the lifeworld provides the point of departure for all our actions and activities, as well as for our learning and knowledge; it is through our lived experience of the world that we can engage with that world and come to know. The lifeworld is, then, pre-reflective and pre-scientific.

Husserl's contention that person and world are inextricably related through lived experience was a response to what he understood as a crisis in the natural sciences at the time. This crisis centred around an assumption that we are independent of our world and can, therefore, adopt an objective stance towards it. According to Husserl, such an assumption overlooks the role of consciousness in the constitution of knowledge about the world. In particular, he argued that a pre-occupation with gaining objective knowledge independent of the subject within science was leading to neglect of, and lack of awareness about, how we can achieve meaning and, thereby, knowledge about the reality in which we live. According to Husserl, we achieve knowledge of the world through lived experience. For example, when we conduct research—whether within natural or social sciences—we are able to investigate aspects of our world through the access that our lived experience provides.

A central outcome of Husserl's phenomenological investigations of how knowledge is possible through lived experience is his theory of intentionality. This theory challenges a conventional view in which consciousness is regarded as something inside the mind (and somehow leaps out, as Bartky expressed it). For Husserl, the notion of intentionality stipulates that consciousness is not closed but *open* and always directed toward something other than itself. He argued that an individual's various modes of consciousness, such as perceiving, judging or imagining, are always related to something, which is not consciousness itself, but is intentionally constituted in an act of consciousness (Husserl 1970b/1900–1901). What is intentionally constituted, however, is not the object in itself, but the object *as* something, that is, the meaning of the object. For example, when looking at the things on my desk, I do not experience them as things, as such, but as something with a particular

meaning, such as a book and a laptop. The meaning, such as “book” or “laptop,” therefore, is inseparable from both the object and the subject who experiences it. Hence, for Husserl, we are inextricably entwined with world through the intentional character of consciousness: it constitutes the meaning of reality, that is, the meaning that appears to us in our lived experience and, thereby, our knowledge about the reality in which we live.

More specifically, for Husserl, the meaning of reality constituted through acts of consciousness (such as, perceiving, judging and imagining) is presupposed in all scientific and pre-scientific dealings with the world. It is in this sense that the lifeworld is both pre-reflective and pre-scientific. This is because without the initial meaning that entities have for us, it would be possible neither to make our way in the world nor to investigate the world scientifically, thereby developing knowledge about the reality in which we live. According to Husserl, therefore, phenomenology’s prime task is to analyse how the (initial) meaning of entities, “presupposed in all scientific, and pre-scientific dealings with entities, gets constituted through ‘acts’ of consciousness and their ‘syntheses’” (Crowell 2005 p. 54).

11.4.2 Heidegger: Being-in-the-World as Our Entwinement with World

In contrast to Husserl’s epistemological investigations, Heidegger’s primary knowledge interest was ontological: he explored what it means for something to be. Through his phenomenological inquiry into being, Heidegger’s (1962/1927) existential ontology both elaborated and challenged Husserl’s notion of the lifeworld in substantial ways. More specifically, while he accepted Husserl’s insight that we are entwined with world through the intentional character of consciousness, Heidegger wanted to “radicalize the philosophical interrogation of intentionality by raising more fundamental questions, neglected in conventional philosophy, of ‘the question of being’ and, specifically, the question of the being of the intentional” (Moran 2000b, p. 42).

According to Heidegger, there is a more basic form of relating to world that precedes the intentional character of consciousness, namely, our *being-in-the-world*. Here, Heidegger does not refer to a conventional “container” view of world, such as a totality of entities. Instead, he regards “world” as a meaningful whole in which we always already live, including specific practice worlds, such as the “world of business”, the “world of sport,” and the “world of the arts.” Moreover, world has an existential meaning for Heidegger (1962/1927, p. 62) in the sense that we, as humans, grow up in, embody and enact various ways of being-in-the-world, such as greeting, talking and sharing meals. We also later enact and embody work-related practices, such as teaching, nursing, managing and so on. Therefore, according to Heidegger, we are *always already entwined with others and things* in specific practice worlds. He attempted to capture this inevitable entwinement by using the hyphenated term, being-in-the-world, as a means of seeking to overcome the limitations of language in expressing this more radical conceptualisation.

For Heidegger, our entwinement with others and things in specific practice worlds forms a meaningful whole or “totality of significance” (1962/1927, p. 93). Our entwinement, then, makes it possible for something to be at all, by providing *intelligibility* to who we are, what we do, and the things we use in our activities and projects. For example, our entwinement with others and things in the practice of teaching enables us to act and to understand ourselves as teachers. In doing so, we may write on a whiteboard and engage in dialogue with students as specific teaching activities, as well as using pens, whiteboards and laptops as specific equipment for carrying out our teaching activities. Similarly, Jörgen Sandberg and Ashly Pinnington (2009) show how the practice of corporate law forms a relational whole of significance, namely, assisting clients with legal risks in various business transactions, so they can achieve what they set out to accomplish. This relational whole of significance enables the lawyers to understand themselves as corporate lawyers, performing corporate law activities in which they take instructions from clients about particular business transactions and conduct associated legal analyses, for which they use legal documents, computers, buildings and clothes as tools.

Hence, Heidegger’s existential ontology proposes that our most basic entwinement with world is not via the intentional character of consciousness, but takes the form of *being-in-the-world* (1962/1927, pp. 49–58). Distinguishing between subject and object derives from this primary mode of existence. Differently expressed:

the subject-object relation becomes possible only insofar as we acknowledge the ontological priority of being-in-the-world. This is because it is our engagement in—entwinement with—particular sociomaterial practices that enables us to understand ourselves as particular subjects and objects as particular things in the first place. (Sandberg and Tsoukas 2011, p. 345)

Even though we may distinguish subject from object for some analytical purposes, then, this distinction itself is derived from our entwinement with world. In other words, the distinction is derived from our being-in-the-world. As Blattner (2006, pp. 12–13) so eloquently captured it:

Heidegger offers an alternative description of experience. He argues that our fundamental experience of the world is one of *familiarity*. We do not normally experience ourselves as subjects standing over against an object, but rather as at home in a world we already understand. We act in a world in which we are immersed. We are not just absorbed in the world, but our sense of identity, of who we are, cannot be disentangled from the world around us. We are what matters to us in our living; we are implicated in the world.

In other words, Heidegger replaces Husserl’s notion of intentionality with being-in-the-world as our primary entwinement with world.

11.4.3 Merleau-Ponty: The Lived Body as Our Entwinement with World

Like Heidegger, Merleau-Ponty considered our being-in-the-world to be our primary entwinement with world. Similar to Heidegger, he, too, explored the ontological character of the lifeworld, taking inspiration from Heidegger’s concept of

being-in-the-world. In contrast to Heidegger, however, Merleau-Ponty's particular focus was the way in which bodily perception mediates our being in the world. In other words, Merleau-Ponty demonstrated how our being in the world is achieved through the perceiving body. He criticised both Husserl and Heidegger for not having explicitly taken into account the role the *lived body* plays in our entwinement with world. For Merleau-Ponty, the lived body is not merely a physical body, as it is typically portrayed, but more importantly, an incarnate subjectivity. On the one hand, Merleau-Ponty argued that we are entwined with world through our lived body rather than via the intentional character of consciousness, as claimed by Husserl. On the other hand, while he agreed with Heidegger that our being-in-the-world forms our primary entwinement with world, Merleau-Ponty claimed that our entwinement with world occurs through our lived body.

Hence, according to Merleau-Ponty, we are always entwined with world through our lived body; our entwinement with world originates from our lived body. As he described it: "I am conscious of my body via the world ... [and] I am conscious of the world through the medium of my body" (1962/1945, p. 82). In his phenomenological investigation of the lived body, he shows how "my body is the fabric into which all objects are woven, and it is, at least in relation to the perceived world, the general instrument of my comprehension" (p. 235). When a medical practitioner uses a stethoscope to listen to a patient's heart rhythm or examines an X-ray of the heart, for example, the stethoscope or X-ray becomes an extension of the body, expanding the capacity for hearing or seeing.

Moreover, for Merleau-Ponty, the notion of the lived body suggests that the primacy of our entwinement with world is non-representational: "to move one's body is to aim at things through it; it is to allow oneself to respond to their call, which is made upon it independently of any representation" (p. 139). As Hubert Dreyfus expressed it, our entwinement with world through our lived body means that we experience ourselves "as an *open responsiveness* to what solicits our activity" (2002, p. 35, italics added). Our ways of being-in-the-world settle in the lived body, then, as ways of thinking, feeling, acting and being that function spontaneously.

Through their particular phenomenological investigations, Husserl, Heidegger and Merleau-Ponty significantly challenge the assumption of a subject-object constellation within conventional approaches to work-related learning—where subject and object are seen as independent of each other—as well as in many practice-based approaches—where subject and object are considered to become related in work performance. Their investigations suggest that we are never separated from our world, but always already entwined with world. Husserl shows that we are inevitably intertwined with our world through the intentional character of consciousness. Heidegger demonstrates that we are entwined with world in a more basic way, namely, through our being-in-the-world. Merleau-Ponty makes Heidegger's insight more complete by highlighting that we are inescapably entwined with world through our lived body in that we always embody specific ways of being-in-the-world, such as teaching and engineering. Taken together, these phenomenological investigations suggest it is not the subject-object constellation

that defines and makes work-related learning possible, but our entwinement with world. How, then, can work-related learning be researched and understood in terms of our entwinement with world?

11.5 Learning and Work from a Lifeworld Perspective

Against the background of the origins and concept of the lifeworld, in the remainder of the chapter we discuss ways in which a lifeworld perspective can advance research on learning within and for work. We begin this discussion by turning attention to what learning entails from a lifeworld perspective, drawing upon the theoretical concepts introduced above. In doing so, we continue to critique the prevalent subject-object notion as a means of clarifying a lifeworld perspective on learning.

11.5.1 Learning Within a Meaningful Whole of Significance

From a lifeworld perspective, learning is made possible by entwinement with our world. Of particular significance for learning is the manner in which our entwinement with others and things in particular practice worlds forms a meaningful whole of significance. Learning takes place on the basis of, and through, this shared meaning totality. For instance, learning to use a stethoscope when examining patients makes sense because tools and procedures such as these are relevant to the practice of medicine and its role within the health system. The various people and things that make up the practice of medicine, such as medical practitioners, patients, stethoscopes and pharmaceutical drugs, take on meaning due to the health system of which they form a part. Conversely, there would be no health system without the practitioners, patients, tools and treatments of which it is comprised.

Learning to be a practitioner only makes sense, then, within such a significance whole. Our activities, concerns and projects are afforded shared purpose and direction in relation to a significance totality, such as the health system. This shared meaning is manifest in ways of being practitioners, both by individuals and collectives. For example, the practice of medicine and its role in the broader health system provides both openings and constraints in terms of what is possible and appropriate in the treatment of patients, for individual medical practitioners and the profession, more generally. It is important to note, however, that a specific practice world is typically not comprised of a singular, unvarying practice (Sandberg and Dall'Alba 2009). Instead, practice worlds incorporate diverse and sometimes competing ways of practising, as we discuss below.

What, how and why we learn, then, takes its meaning from the totality of significance within which we are entwined with others and things. As noted above, this entwinement challenges a conceptualisation of learning that assumes an individual subject learning about an independent object. Subject and object only have meaning

and relevance in relation to meaningful significance wholes; they are never entirely independent or separable. In other words, from a lifeworld perspective, what makes learning possible is not an individual learning about an independent object. Instead, learning is made possible and takes place within a specific practice world and a meaningful whole of significance. Moreover, the totality of significance guides and shapes our learning. It provides learning with meaning and purpose, such as what matters to us in our learning, what is relevant to learn and appropriate ways of doing things in the particular practice.

Within Heidegger's notion of the lifeworld, we are continually engaged with a range of such concerns, activities and projects, many of which are shared with others. Rather than being subjects independent of our environment, we are oriented towards what we are learning within a meaningful whole of significance. As Heidegger expressed it, we are oriented towards what we are "not yet" (1962/1927, pp. 185–186). In other words, our learning matters to us; is of consequence for us in some way. If this were not the case, it is unlikely that learning would be worth the risk involved, especially, perhaps, the risk of failure to learn. As we are oriented to learning what matters to us, the possibility of complete disinterest and impartiality is removed. Through this commitment to learn, we invest something of ourselves (Blake et al. 2000, p. 26), which precludes separateness.

Not only does our entwinement with a practice world guide what we learn, but also our shared commitment and interest in learning something entails entwinement with others in a significance whole, whether or not we meet these others face to face. For instance, we are intertwined with the author(s) (and readers) of a website or book we read on a topic of interest, as well as with colleagues, fellow students or friends who discuss with us what we have read. In other words, when we learn we are part of a wider learning community. This is an additional sense in which we are not independent individuals seeking to acquire knowledge that is separate from our lives and ourselves. Rather, it is the various concerns, activities and projects that are integral to living our lives which make us willing to learn (Barnacle 2005; Barnett 2007), while also providing direction and purpose for our learning. At times, the commitment to learn that we share with others endures for an extended time, such as throughout the period required to enrol in, and complete, a programme of study necessary to entering a particular profession or occupation. Sometimes this commitment to learning can persist throughout working life, although the people with whom we share this commitment may shift over time.

11.5.2 Learning as Enacted and Embodied

While entwinement with our world makes learning possible, Merleau-Ponty (1962/1945) provides insights into the manner in which the lived body is the means by which we are inevitably entwined with, and gain access to, our world. What we learn is not simply acquired or accumulated, but is incorporated into the body and

enacted as we perform our work or go about in the world. This embodiment and enactment of our learning is evident in the way a medical practitioner examines a patient through carefully listening, feeling and looking, while diagnosing an ailment. Similarly, melodiously playing a musical instrument, creating an intriguing narrative, fashioning an elegant garment and constructing a well-crafted building are all demonstration of the enactment and embodiment of what we have learned. They are also enactment of how we learn. On a more everyday level, our fluent use of language in communication and the manner in which we navigate within local landscapes also exhibit enactment and embodiment of learning in various forms.

In embodying and enacting what we learn, we are not constrained within the boundaries of our material body. Rather, as Merleau-Ponty has pointed out, our body extends into, and incorporates, things in our world:

To get used to a hat, a car or a stick [for example, a blind person's cane] is to be transplanted into them, or conversely, to incorporate them into the bulk of our own body. Habit expresses our power of dilating our being-in-the-world, or changing our existence by appropriating fresh instruments. (p. 143)

This body extension illustrates how the body “is the fabric into which all objects are woven” (p. 235). This capacity to extend the body through incorporating tools and technologies has made possible the recent developments in telemedicine in which patients' ailments are diagnosed, even when the patients and medical specialists may never meet (see, for example, Gherardi 2010). In these technology-mediated medical examinations and consultations, the various parties involved and the technologies used are intertwined in a manner that collapses or overcomes some of the obstructions due to distance. As in the case of telemedicine, new ways of extending the body and of enacting practice can lead to new forms of sociomaterial practice. Our embodiment of practice, then, is a further demonstration of entwinement that undermines the notion of subject and object as independent of each other. In underlining this point, Merleau-Ponty turned on its head the subject-object notion by noting that “I apprehend my body as a subject-object, as capable of ‘seeing’ and ‘suffering’” (1962/1945, p. 95). Person and world are, then, unavoidably entwined in the performance of work or everyday activities.

11.5.3 Learning as Transformative

The performance of work or everyday activities is given shared purpose and direction through our ways of being in the world, as noted above. Through our ways of being electricians, historians, speech pathologists and so on, we come to understand ourselves as practitioners, practice as consisting of particular activities, and things as equipment used in carrying out our activities. Similar to the aspects identified above, ways of being provide an additional sense in which subject and world are entwined, as we illustrate below. Again, there is no subject independent of a world about which we seek to learn.

Our ways of being give meaning, then, to what we do and who we are, both personally and as members of shared practice. In other words, ways of being can be seen as personal-social (Dall'Alba 2005; Sandberg and Pinnington 2009). Max van Manen (1999) illustrated this personal-social character of practice in his phenomenological study of teachers in schools. He explained that the shared practice of teaching is manifest differently by teachers in response to the interactions and situations in which they find themselves:

Teaching techniques employed by different teachers may look behaviorally the same on the outside but individual teachers always have acquired and developed these practices in a personal manner—sometimes in entirely different biographical and situational settings. Thus, particular practices get embodied in the context of personal life histories and backgrounds, and these practices become habituated in uniquely different situational and relational spheres. (p. 74)

While we can simply fall into line with the ways in which others research, teach or manage, we can also exercise agency in contributing to enacting and developing practice in new ways. We are not simply limited to what has occurred in the past in enacting practice. Importantly, we can allow our “open responsiveness to what solicits our activity” (Dreyfus 2002, p. 35) to guide us in learning and performing practice. Heidegger illustrates this responsiveness through the example of a cabinetmaker's apprentice who is learning the craft:

His learning is not mere practice, to gain facility in the use of tools. Nor does he merely gather knowledge about the customary forms of the things he is to build. If he is to become a true cabinetmaker, he makes himself answer and respond above all to the different kinds of wood and to the shapes slumbering within wood—to wood as it enters into man's dwelling with all the hidden riches of its nature. In fact, this relatedness to wood is what maintains the whole craft. Without that relatedness, the craft will never be anything but empty busywork. (1968, pp. 14–15)

In this quote, Heidegger points out that simply acquiring knowledge or skills through repetition can lead to “empty busywork.” This form of repetition contrasts with learning how to be a cabinetmaker, which includes responding to the various kinds of wood. In the latter instance, increasing experience can progressively contribute to learning ways of being that settle in the body as they become familiar. This does not merely involve repetition in the sense of repeating the same actions, but each new situation, each new piece of wood, brings novel challenges that must be responded to if learning is to progress beyond empty busywork. Moreover, as we noted above, learning ways of being entails embodying and enacting practice, which includes entwinement with others and things.

As entwinement with our world makes learning possible, obviating separateness, it implies that we not only learn knowledge and skills but, more importantly, our relation to our world changes in the process. As Heidegger pointed out, fields of knowledge, such as economics, carpentry or social work, are not only forms of knowing, but also ways of being human (1962/1927, p. 408; see also pp. 88–90). This means that learning incorporates not only an epistemological dimension (or *what we know* and *can do*) but also an ontological dimension (or *how we are learning to be*) (for elaboration, see Dall'Alba 2005, 2009; Dall'Alba and

Barnacle 2007; Thomson 2001; Vu and Dall’Alba 2011). These two dimensions of learning are not additive in character, but are inevitably integrated as we learn. This conceptualisation of learning follows from Heidegger’s existential ontology, which we outlined above. A lifeworld perspective highlights the integration of epistemological with ontological dimensions for learning to engage in practice. Our learning unavoidably extends beyond what we know and can do, to who we are.

11.6 Researching Work and Learning from a Lifeworld Perspective

The conceptualisation of work-related learning that we elaborated above provides a springboard for describing how a lifeworld perspective can inform and enhance research on learning within and for work. We propose that this research can be advanced through a shift in focus from either a subject and object that are independent of each other (as in conventional approaches) or that become related during work performance (in several practice-based approaches) to the inevitable *entwinement* of people and things in specific practice worlds.

While there are many aspects of a lifeworld perspective with relevance for work-related learning (see, for example, Gibbs 2011; Dall’Alba 2009; Sandberg and Dall’Alba 2009; van Manen 1999), in the remainder of this chapter we select some key features that enable us to expand upon the theoretical concepts we elaborate above. These features include attending to the multiplicity of practice and associated development trajectories within the historical, social, cultural, material contexts in which they occur, as well as taking account of the ontological dimension of learning to engage in work. Each of these features derives from our *entwinement* with world. Below we use empirical material from longitudinal research on students learning to be medical practitioners (see Dall’Alba 2009) in illustrating these selected features of researching work and learning from a lifeworld perspective.

11.6.1 *Multiplicity of Practice*

While practice approaches commonly regard specific practice as a singular, relational whole (Dall’Alba and Sandberg 2006), such as the practice of medicine, accounting or neurobiology, a lifeworld perspective draws attention to the multiplicity of practice across and within settings. Due to *entwinement* with our world, any particular sociomaterial practice is enacted in a range of ways. This is clearly evident when we investigate the enactment of practice over time. For instance, while blood-letting was one of the few treatments available within early twentieth century medicine, it has been replaced by the highly technologised, institutionalised practice of medicine we encounter today. These contrasting ways of practising medicine within

distinct time periods have required substantially different ways of being medical practitioners.

As well as becoming modified over time, the enactment of practice at any specific point in time varies across social, material contexts (Billett 2001; Dall'Alba 2009; Mol 2002; Sandberg and Pinnington 2009; Schutz 1945). For instance, the treatment of a health ailment can be approached in markedly different ways from one hospital department to another, even when there is agreement about the source of the ailment (see, for example, Mol 2002). Additional variation in practice across settings can be seen from one country to the next. For example, changes to laws regulating in vitro fertilisation in Italy necessitated modifications to practice that have distinguished in vitro fertilisation practice in Italy from that in other countries (Gherardi and Perrotta 2011). Moreover, the medical treatments widely available to patients in Italy differ from those provided in Mozambique due to dissimilar resources, with implications for how medical practice is enacted. Not only does practice change over time with new developments, then, but also the social contexts and material conditions for practice influence how it is performed. This multiplicity in the enactment of practice demonstrates entwinement with world that is highly relevant for research on work and learning.

Even within one and the same setting, practice is understood and enacted in a variety of ways, albeit within the constraints of what is possible and considered appropriate. For example, a Swedish student named Gunnar¹ who was learning to be a medical practitioner described the task of a medical doctor, as follows:

My task, yeah, when the patient comes in, to identify the problem or let the patient talk about it and then, yeah, the medical, you make a diagnosis or, in any case, define the problem. And then you start an investigation or address the problem through treatment or send the patient home, if you make that judgement. And you can give calming advice and can really motivate why, or at least always be able to explain in a language that suits the patient. Which I think, in actual fact, can be very difficult. It varies so much, how you should tell different people. (second semester of fifth year, pp. 41–42)

For Gunnar, medical practice was conceptualised in terms of the work of the medical practitioner in defining, diagnosing, investigating and/or treating the problem presented by the patient, unless the practitioner makes a judgement that treatment is not needed and sends the patient home. In other words, medical practice is framed in terms of a range of procedures and solutions that the health care system has to offer, as well as informing the patient about the medical practitioner's decision in an appropriate manner. Gunnar's way of being a medical practitioner ascribes an active role to himself, while the patient is constructed primarily as a source of information about a problem that may or may not be defined as medical in nature. This is part of the decision to be made by the medical practitioner.

While Gunnar's conceptualisation of medical practice was not unusual within the cohort, some of the students within the same medical programme were quite

¹Names of research participants have been changed for reasons of anonymity and quotes from medical students have been translated from Swedish.

critical of this way of being medical practitioners. For example, Max described what medical practice involves, as follows:

In a professional way, deal with the problems patients think they have. That's the core in all of it. And, in any case, don't only deal with the problems that you, as a doctor, think the patient has.

Interviewer: Yeah, and do you think there's a difference between them?

Yes, yes.

Interviewer: The patient's problem and

Yes, definitely. You see that a lot. And I think it's very easy to start to do that, too, that you think in terms of diagnoses. And if it isn't any of them, then it isn't anything. While a patient who comes in, of course, always has a cause behind why they come. But you can still take care of it in a professional way, even if it means sending them to someone else or if it means having a good conversation and explaining what it, what you've come up with. And, but it's actually the professional disposition it's about.

Interviewer: Is it difficult to work out what the patient's [problem] is, when you yourself have this, all the medical with you, do you think?

Yes, it can actually be a reason. You think, you can just try to locate what the patient says on some diagnostic map. Well, clearly it might be, but I don't think it's so impossible to actually listen when they're talking about what it is. (p. 43)

Interviewer: And you think it's possible, it's possible to work it out, what the patient really wants, you mean?

Mm, yes, I think so. (pp. 42–43)

Similar to some of the other medical students, Max argued that affording the health care system priority over the health of patients often led to negative consequences for addressing patients' health problems:

There are many patients who never really get taken care of well, and they go to someone else and get sent around some more. And they never get the help they maybe could have got right from the start.

Interviewer: Yeah, and what do you think that depends on? That they don't get the help at the start?

Yeah, that probably depends on being so directed to, to what you yourself, what healthcare has defined as diseases. And not, not to dealing with all the problems that come. (Max, first semester of fifth year, pp. 44–45)

Max went on to comment in an ironic tone that it was possible to respond to the question of what medical practice involves in an entirely different manner from what he had been arguing:

But you can respond more cynically to it. That you, that it's about sending patients onwards [pauses, then laughs]. And it ends up being some kind of circulation, so that the whole thing [the health system] itself survives. (p. 45)

Within the same medical programme and student cohort, medical practice was enacted in markedly different ways, even at the end of the programme (see Dall'Alba 2009). Similar variations are also evident in the practice of experienced professionals within and beyond medicine (see, for example, Billett 2001; Mol 2002; Sandberg and Pinnington 2009; Stålsby Lundborg et al. 1999). This multiplicity challenges the duality of a single subject performing independent work, as well as the notion of practice as a singular, relational whole. Instead, practice is enacted and embodied in varying ways due to the entwinement of diverse practitioners with shared practice worlds at particular points in time that each has its own material conditions.

The multiplicity of practice also calls into question a prevailing view of development from novice to expert along a single development trajectory (Dall'Alba and Sandberg 2006). Although we acknowledge the potential value of regarding novices as located on the periphery of practice worlds and then progressing toward more fully enacting and embodying practice, our research challenges the assumption that this movement is unidirectional along a common development path. Such a model of learning fails to adequately account for development in diverse, and even unexpected, directions (Engeström and Miettinen 1999). In a phenomenological study of workplace learning by allied health professionals, Ann Webster-Wright (2010) argued that professional development programmes often fail to take account of such complexity and, consequently, do not adequately meet the learning needs of professionals.

The multiplicity of practice has particular relevance for research on work and learning in several ways. Variation in the way in which practice is enacted within and across settings can present challenges for aspiring practitioners who are learning to engage in practice and for practitioners who move from one workplace to another. If a procedure or activity is carried out in a specific way by one practitioner or in a particular setting, but done differently elsewhere, how is a newcomer to deal with this? And what do these differences mean for the researcher investigating the practice in question? When enactments of the 'same' practice vary, taken-for-granted assumptions by practitioners and researchers about what characterises the practice may be called into question.

In addition to presenting challenges, this multiplicity of practice opens possibilities for enacting practice in varied ways. Experiencing this multiplicity, in itself, can extend awareness about possible ways to be, as well as demonstrating how some of these ways of being practitioners are embodied and enacted. The multiplicity of practice can provide a source of both positive and negative exemplars that assist in identifying how to act and also in discerning the way one does not want to be as a practitioner. As one medical student, Kristina, expressed it in relation to contact with patients:

All patient contact is particular, in its own way. It isn't an ordinary meeting between people, and that. But it's a bit particular. And that, that's the same whatever you do, whatever type of doctor you are, that it must be. Yeah, it's a particular contact and this contact maybe you haven't been able to practise so much under supervision [during the medical programme]. But this, you've stood and watched and listened to how people do it and hoped that I want to have a sense of what I'm doing when I meet patients, so I can do what that doctor did, because I think it's good. Or that was clumsy, I don't want to become like that. (first semester of fifth year, p. 21)

Encountering a range of ways of being practitioners, therefore, can enable aspiring and experienced practitioners to engage in practice in ways that are consistent with their own understanding of practice and their preferred ways of being practitioners. In other words, the varied ways of being practitioners that we encounter contribute to guiding and shaping our learning about how to engage in practice, as well as how to be practitioners. Moreover, this multiplicity of ways of being offers opportunities for enhancing practice, both as an individual and collectively, through exposure to other ways of being practitioners.

The multiplicity of practice carries an inherent risk, however. It is possible to learn to carry out the various procedures and activities comprising a practice with limited or inappropriate understanding of what the practice entails. The realisation of this risk is evident when those seeking a service fail to be provided with the service they seek and also when negligence claims are successfully brought against practitioners. In both promoting learning and conducting research, recognising the multiplicity of practice does not imply acceptance of any form of enacting practice as appropriate. Instead, key questions concern what constitutes ethical, skilful and accountable performance of the practice in question.

11.6.2 An Ontological Dimension of Learning

In addition to overlooking the multiplicity of practice, practice-based approaches commonly adopt an epistemological focus in exploring learning and participation in practice, which emphasises the knowledge or activities that are learned or used in preparing for, or engaging in, practice. In adopting a focus on knowledge or activities, these practice approaches overlook or downplay the ontological dimension central to work and learning or, in other words, attention to who learner-practitioners are becoming, both individually and collectively. Where an ontological dimension is taken up, it is frequently treated as occurring “in addition” to learning the necessary knowledge or activities. Often it is unclear how personal (or identity) transformation is integral to learning to perform the practice in question.

Not only do aspiring medical practitioners learn about symptoms, diseases, procedures and activities that are integral to the practice of medicine, they also *learn to be* medical practitioners. In adopting a focus on knowledge or activities, attention is diverted from how practitioners are learning to be. Moreover, in research on doctoral candidates learning to be researchers, Robyn Barnacle (2005) pointed out that the emphasis in the current policy context on research that meets labour and commodity requirements within a knowledge economy is not conducive to taking into account this ontological dimension. She argued that a limited conceptualisation of doctoral becoming in line with this policy emphasis “misses the real import of the learning experience: that it is transformative” (p. 187). The process of becoming that occurs while learning to engage in work is not incidental, but is necessary to enacting and embodying practice. In this way, learning to engage in practice transforms practitioners’ relation to their world or, in other words, their being-in-the-world. This means that entwinement with world is never static, but the process of becoming practitioners continues throughout working life.

While ways of being are enacted and embodied in the performance of practice, they are not only an individual matter but entail learning to perform social practice. As noted above, learning how to engage in practice and how to be practitioners is guided and shaped by the ways of being practitioners that we encounter as this learning occurs. More particularly, we take over others’ ways of being through socialisation, education and work. This is especially the case when we are learning

unfamiliar practice or aspects of practice we have not yet accomplished. As Kristina noted above, taking over others' ways of being is not necessarily immediate or uncritical, but many of the students gave considerable thought to the kind of medical practitioner they aspired to be.

Kristina's experiences within a clinical course in psychiatry during her fifth year in the medical programme serve to illustrate the way in which we take over others' ways of being as we continually learn to engage in practice. In this course, Kristina was gradually introduced to ways in which medical practitioners worked with patients who had mental health problems. After an introductory week of lectures that provided an initial orientation to psychiatry, Kristina observed experienced practitioners during their interactions with patients. Immediately prior to these observations, it was standard practice that the medical practitioner asked the patient if the student could observe. Kristina began her observations in the outpatients clinic where she began to get a sense of how to hold a conversation with those who have mental health problems:

In outpatients, for example, I mostly sat and watched. But I was able to sit in the whole time.... I went with a fantastic doctor there, who introduced me in such a smart way that I was not once turned down.... I think I got a lot out of it, even if I wasn't so active. Just sat and listened and was there, so just how you hold a conversation like that, when people have problems. (p. 16)

After a period of observing, Kristina was given some opportunities to initiate conversations with patients about their mental health, while under supervision from experienced psychiatrists:

It was this general psychiatric ward. And I had two patients there who I followed a bit more closely, that I had conversations with. With a supervisor, that is, not by myself, but I was the one who talked and that. And we had gone through it beforehand, what should be taken up. And then, in most cases it was the patients themselves who had requested the conversation. And then we'd asked if it was OK that I led the conversation, with a supervisor present. So that's how it was. (p. 16)

Prior to each of the patient conversations, Kristina was given an opportunity to draw upon the experience of a psychiatrist in discussing what was appropriate to take up with the patient. These discussions alerted her to ways of dealing with the potentially sensitive and challenging nature of talking with patients who have mental health problems, with which she had previously little experience. Kristina then used these discussions with the psychiatrists to guide her conversations with patients:

It started with, that I asked what is was that made the patient want to have this conversation. And then you get a response, depending on what it can be and sometimes then, then it was easy to follow a kind of thread. While with other patients, maybe it was difficult to find something to take hold of. Then I had to kind of try to, well, direct it by asking a bit about how the days had been maybe or things like that. And then we went through what it, what had, what we had planned. It was discussed from the point of view of where the bar was likely to be, you could say. How much you could discuss this. Like, just now with this patient, you could say. And so try to—it has a sophisticated name—"build an alliance," to earn the patient's trust and all that. I had, naturally, worked on building that up a lot beforehand and so. Because it's quite difficult to hold a sensible conversation. You don't know where you, well, as I said, I have a lot of respect for these people, although it can be,

can look very confused.... But I think it turned out to be quite a good conversation. And then afterwards we [student and psychiatrist] went through it in a way that was helpful, since there was time set aside for students and discussion afterwards and that. It was really good. But it happened several times that I got really good follow up. (pp. 17–18)

So, after observing the practice of experienced psychiatrists and discussing this practice with them, Kristina made some attempts to talk with patients under supervision. In other words, she attempted to take over and enact some of the practice she had observed and discussed in order to gain a preliminary understanding of what is involved in being psychiatrists. As Kristina acknowledged, some of the conversations with patients were difficult, so the supervising psychiatrist showed her a way forward when this was needed, allowing her an opportunity to deepen her understanding of the practice of psychiatry:

Before one of the conversations [with a patient] my supervisor said that we, “I’ll take over it if becomes difficult” and that.... Yeah, he was able to sharpen the questions a bit maybe in a way that I had missed, so he did that, I know, on some occasion. I continued to talk, but he shot in small details, more detailed, focused questions that made it easier for the patient to respond to them.... I understood, like, since I heard the question, well, where he wanted to get to. So I thought it worked well and I learned a lot. (p. 21)

Kristina appreciated the value of benefitting from the more extensive expertise of the experienced practitioners during the medical programme, both in having access to how they performed the practice and in receiving advice about her own unfolding practice of medicine:

I think this degree programme is so fantastic, just in these situations where you have, where you stand there with a patient and examine them in your fumbling way and, like, your inexperienced way, and then you have a supervisor right next to you. Then the supervisor can be a real luxury, in a way. And I feel that, it’s quite something to be able to do such a programme. Because you are very close to, to experience and that. And most of the ones I’ve met have been really generous with it. And they’ve wanted to share what they can. And I think it’s good to be able to see how, how ordinary people do it. Because you have to deal with people, and that. You can’t just read how to do it. You have to do it and then do it again and then maybe you don’t make mistakes so many times, if someone gives you advice while you’re doing it (pp. 6–7).

Taking over others’ ways of being is an additional sense in which ways of being are personal-social: we take over others’ ways of being in social practice, embodying and making them our own. In this way, the character of our entwinement with world shifts, unfolding over time. For complex forms of practice, this typically takes an extended period of time. As Kristina notes above, it is not something that can be learned only from reading how to do it. Embodying and enacting practice also requires developing some sense of what the practice involves, as Max pointed out: “You have to, like, find your feet a bit ... and it’s very much getting a feel for it. If you are new somewhere, then maybe you don’t have that feel for what it all should actually lead to” (first semester of fifth year, p. 12).

In the students’ accounts of how they were learning to engage in the practice of medicine, they interwove descriptions of what they learned about symptoms, diseases and treatments with how they were learning to be medical practitioners.

In other words, their accounts included both epistemological and ontological dimensions of learning to engage in practice. Similar to some of the other medical students, Kristina pointed to the distinction between epistemological and ontological dimensions—without using this terminology—and she noted the importance of both dimensions for medical practice:

You know, [when interacting with patients] I have myself to start from, in fact. And it’s, I’ve been so fortunate in my life to be quite healthy, and that. So I don’t have so much experience of being a patient. But I, I would appreciate being respected as a person, whatever was involved. And I’d want a sensible explanation at my level, about what [ailment] it is that I’ve got. And, of course, I’d want to know what kind of help there was available. But, and that’s what I have to start from, in fact. And that’s what I’d like to be [as a doctor], the person who can do that. And we do this degree and gain knowledge about things and that’s what I want to communicate [to patients], then, in a sensible way.

Interviewer: And do you think you get what you need during the medical programme to become the kind of doctor you want to be?

Well, yes and no. I think that actually what you get during the medical programme is a heap of theory. And mechanisms and aetiologies about conditions you can suffer and diseases here and there. And diagnoses and things. And then different treatment strategies and that. And that’s a part, which is some kind of core, I would think. Or which is some kind of part of the whole. But you aren’t trained so much in the rest, more than when you have those conversations before and after you’ve met a patient. The rest is a, the rest is being a good doctor. That, that ability to converse and that ability to meet a person with respect, in fact. And that’s another journey. (pp. 27–28).

In order to capture fully what learning to engage in practice involves, then, it is important that research on work and learning pays attention to this integration of epistemological with ontological dimensions as part of learning. A lifeworld perspective highlights the integration of epistemological with ontological dimensions for learning to engage in practice. As noted above, our learning extends beyond what we know and can do, to who we are.

11.7 Concluding Remarks

In this chapter, we have proposed and elaborated a lifeworld perspective on learning within and for work. We have developed a critique of a conventional separation of subject and object as a means of explicating a central tenet of the notion of the lifeworld, namely, that we are always already entwined with others and things as we engage in various practice worlds. We have explored how a lifeworld perspective calls into question the assumption of a subject-object duality in substantial ways. This challenge is pertinent whether the subject and object are regarded as independent of each other (as in conventional approaches) or as becoming related during the performance of work (in several practice-based approaches).

Utilising our critique of the subject-object constellation, we have discussed various aspects of a lifeworld perspective. We have explored how our entwinement with world makes learning possible, while pointing to ways in which such a perspective affords novel resources for bringing features of practice under critical scrutiny.

Some of the features that we have sought to illustrate include the multiplicity of practice, which contrasts with a prevalent conceptualisation of practice as a single, relational whole. Across time, cultures, and social and material settings, the enactment of practice varies in line with our entwinement with world. We have pointed out that the multiplicity of practice allows us to call into question a pervasive view of learning within and for work as occurring along a single, unidirectional development trajectory.

Drawing upon Merleau-Ponty's notion of the lived body, we have described how the body provides the means of access to our world, thereby comprising a vehicle for learning and engaging in practice. This bodily entwinement with world is evident through the ways in which our bodies extend into, and incorporate, things in our world, such as tools we use in carrying out our work. This body extension also enables connections with others, such as through technology-mediated communication. The concept of the lived body dispels a prevailing conundrum in which subjects leap into a world from which they are separated. In explaining how the body is the vehicle of access to the world, this concept enables closer analysis of the embodiment and enactment of sociomaterial practice.

As we noted above, the lived body can be regarded as personal-social. This is evident when we take over others' ways of being practitioners and make them our own. The performance of work is attributed shared purpose and direction through these ways of being. Our ways of being give meaning to what we do and who we are, both personally and as members of shared practice. These ways of being highlight an integration of epistemological with ontological dimensions of learning within and for work. Not only do we learn knowledge or activities within practice, but also our relation to our world is transformed in the process. We have illustrated how this ontological dimension is not simply an additional component, but is integrated with an epistemological dimension of learning to engage in practice. This account extends research on personal transformation or identity change in work-related learning in that it demonstrates the integration of these dimensions.

In conclusion, we have explored how social, historical, cultural and material features of practice are interwoven within a lifeworld perspective, undermining the notion of a subject independent from an object. We argue that consistent adoption of such a lifeworld perspective can advance research on work and learning in new and significant ways.

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Chapter 12

The Neuronal Base of Perceptual Learning and Skill Acquisition

Mark W. Greenlee

Abstract Procedural and perceptual learning are important processes involved in skill acquisition and the formation of expertise. This chapter provides an overview of recent research on the neuroscientific investigation of these different learning forms underlying the acquisition of skills. We focus on low-level processes in perception and motor control and how these low-level processes are improved by learning. Other forms of neural plasticity like adaptation, habituation, sensitization, conditioning and extinction are differentiated from procedural and perceptual learning. A brief introduction to the neuroanatomical basis of visual function is given. We next review the research on the cognitive neuroscience of these forms of learning with a focus on studies that use functional magnetic resonance imaging (fMRI). Recent results on dopaminergic and cholinergic processes underlying learning are discussed in the context of a top-down attention-gated model of perceptual learning. Finally an overview is given of research on skill acquisition and the implications of this research on the design of learning environments.

Keywords Perceptual learning • Procedural learning • Skill acquisition • Functional magnetic resonance imaging (fMRI) • Implicit memory • Brain function • Visual system

Sensory systems represent an essential interface between the organism and its environment. Throughout life the organism continuously interacts with stimuli, objects and environments and this interaction has a long-lasting effect on its central nervous system. Humans learn to respond optimally to stimuli as they

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occur in everyday scenarios. The neuroscience of learning and memory attempts to explain how the nervous system adapts to new environments and learns through repeated practice. Two forms of learning have been the focus of neuroscientific investigation: procedural learning and perceptual learning. *Procedural learning* is defined as a training-induced change in performance for a given task, in which repeating a complex activity leads to an automatic (and often unconscious) production of highly adaptive behaviour or skill. *Perceptual learning*, on the other hand, is

the specific and relatively permanent modification of perception and behaviour following sensory experience. It encompasses parts of the learning process that are independent from conscious forms of learning and involve structural and/or functional changes in primary sensory cortices (Fahle and Poggio 2002).

These two forms of learning are involved in skill acquisition and they underlie at least partly the formation of professional expertise.

This chapter will introduce concepts in neuroscience required to understand the possible changes that occur in biological nervous systems when an organism is repeatedly exposed to a particular stimulus configuration. The focus in this chapter will be on low-level processes in perception and motor control and how these low-level processes are improved by learning. More complex cognitive skills that build on these low-level processes will be discussed in the final section of this chapter.

To introduce the reader to concepts used in neuroscience (see glossary below), processes like adaptation, habituation, sensitization, conditioning and extinction will be defined and differentiated from procedural and perceptual learning. Each of these processes exhibits specific time constants that describe the change in neural activity over time, being either short- or long-term. These low-level forms of learning are discriminated from other forms of learning and memory that require conscious encoding, consolidation and recall. Next, a review is given of the most relevant work on the topics of perceptual and procedural learning. Some recent insights into the role of dopaminergic and cholinergic processes will be given. The chapter will conclude by providing a description of the state of the art in the neuroscientific study of skill acquisition. A discussion of the possible ramifications of this research on the design of learning environments will be given.

12.1 Introduction

The mammalian brain exhibits a great capacity to adapt itself to the environment in which the host organism lives. This chapter will focus on the changes that take place in the developing and the adult brain as the organism interacts with its environment. Perceptual learning has been investigated for all sensory systems (Fahle and Poggio 2002). Here, a review of the literature is given on perceptual learning and it is compared to procedural learning and general skill acquisition. Finally, conclusions will

be drawn from this work and a statement will be made about how neuroscientific research can help us better understand skill acquisition and the formation of expertise with a focus on visual function and visually guided sensorimotor skills. The limitations to the neuroscientific approach will also be discussed.

Expertise reflects the explicit and implicit forms of domain-specific knowledge and skills acquired over an expert's lifetime. Such complex learning processes are currently only indirectly accessible to neuroscientific analysis (e.g. Schlegel et al. 2012). However, sub-processes like expert perception, perceptual learning, skill acquisition, as well as the acquisition of high-level cognitive skills such as problem-solving, insight, formations of concepts, categories and strategies can be studied in human participants while they interact in simulated scenarios during brain imaging. This chapter will review findings from research on different aspects of the acquisition of human expertise with a focus on implicit learning. To introduce the reader to the neuroscientific approach to the study of implicit memory, definitions are given of different forms of learning and forms of neural plasticity as they can be studied in humans and other mammals in the neuroscience laboratory.

12.1.1 Definitions

To start a few useful definitions will be given that can help to guide the reader into the topic of the neuroscientific approach to understand forms of implicit memory like procedural and perceptual learning.

Procedural learning is the ability to acquire a set of skills required to perform a particular task, such as the various perceptual and motor skills requisite for sports expertise in e.g. competent alpine skiing. Procedural learning also implies the optimization of skill execution, as measured by motor latencies, reaction times and kinematics. Procedural memory is an implicit form of long-term memory that reflects the ability of the organism to store knowledge about “how to do” something. In most cases, procedural learning and procedural memory are non-verbal forms of learning and memory. This form of knowledge cannot easily be expressed in words, but rather is illustrated in the act of performing the skilled task activity. Procedural memory should thus be differentiated from explicit forms of long-term memory like autobiographical and semantic memory. The former type of memory provides us with knowledge about how to do things – like the skills associated with using a smart phone or riding a bicycle – whereas the latter form of memory provides us with knowledge of ourselves, about the present-day world and about history. Although robust over time, skill memory can be interfered with if a second skill is learned immediately after the first (Robertson 2004).

Perceptual learning is related to the long-lasting improvement in our ability to perceive external and internal stimuli based on repeated exposure to these stimuli. Eleanor Gibson (1963) defined perceptual learning as

“any relatively permanent and consistent change in the perception of a stimulus array following practice or experience with this array ...”. Perceptual learning “... improves discrimination between stimuli that could not be discriminated before the learning; observers may learn to perceive something new that they could not perceive before.” (cited in Fahle and Poggio 2002, p. ix)

Although a large majority of perceptual research has been conducted with visual stimuli, it is not restricted to this modality. Perceptual learning takes place after practice or experience with any type of stimuli affecting any of our senses, including auditory (Fitzgerald and Wright 2011), somatosensory (Carey et al. 2011), vibrotactile (Tang et al. 2009), olfactory (Moreno et al. 2009) and taste (Hughson and Boakes 2009).

Other related concepts in neuroscience are adaptation, habituation, sensitization, conditioning and extinction. To appreciate the difference between these concepts and those of procedural and perceptual learning, a brief definition of each is provided below.

Adaptation is related to a change in sensitivity to stimulus intensity following prior exposure to a particular stimulus. These effects usually have been found at or near the absolute detection threshold (Blakemore and Campbell 1969), but can also be shown for supra-threshold stimulus intensity levels – such as for contrast discrimination (Greenlee and Heitger 1988). Although usually associated with low-level visual features like light level, colour, contrast, spatial frequency, orientation, etc., adaptation has also been shown to affect high-level visual perception required for identity recognition, ethnic classification and gender categorization (Webster et al. 2004).

Habituation is related to the absence of an orienting reflex after a stimulus has been presented many times without negative or positive consequences for the organism (Groves and Thompson 1970; Castellucci et al. 1978).

Sensitization is the reverse of adaptation: here repeated stimulation leads to a higher likelihood that the organism or individual receptor will respond to the stimulus (Groves and Thompson 1970; Carew et al. 1979).

Conditioning (Classical or Pavlovian) is a form of associative learning, where a neutral, conditioned stimulus (CS), e.g. a medium-intensity tone, is presented together with an unconditioned stimulus (UCS), e.g. an electric foot shock. The organism learns to exhibit a conditioned response (CR) in an anticipatory fashion to the presentation of the CS even in the absence of the UCS. The Russian physiologist, Ivan Pavlov, discovered this form of conditioning while studying the salivary response to food in the dog (Pavlov 1927).

Operant conditioning (also referred to as reinforcement learning) is a form of associative learning, where a response is reinforced with a reward. In operant conditioning behaviour is modified by its consequences. Rewards or reinforcement increase the likelihood that the behaviour will be exhibited again, punishment decreases the likelihood that the behaviour will be shown again.

Extinction is related to the dissociation between the prior learned association between in the CS and the UCS in classical conditioning. The organism ceases to respond to the CS when it is repeatedly presented in the absence of the UCS (Carew et al. 1981). In operant conditioning, the organism no longer exhibits the conditioned behaviour when the reward is no longer given.

As can be seen from these definitions, there are many forms of learning and neural plasticity. A detailed comparison between procedural and perceptual learning suggests that there are some similarities but also a number of differences between these different types of learning. Both forms of learning lead to an improvement in performance. For procedural learning the emphasis is placed on motor learning, speed and precision of response execution and long-term skill acquisition, whereas for perceptual learning the focus is on sensory discrimination performance and the specificity of this learned perceptual skill. In this chapter the experimental evidence is reviewed for these two different types of learning. To set the stage, a short introduction is given to the most important of sensory systems – vision – that allows us to detect and discriminate objects at a distance without having to come into immediate contact with them. The neural basis of visual processing is described and examples of neural plasticity in the visual system associated with the training-induced improvement in visual processing are given. The results of studies are described that examine the neural basis of procedural and perceptual learning by means of micro-stimulation, electrophysiological or brain-imaging techniques. Briefly a description is given of a model put forth by Roelfsema and colleagues (2010), the attention-gated reinforcement learning (AGREL) model, according to which a reward-based neuromodulatory signal enhances responses in all active synapses during perceptual learning. In the final section of this chapter, recent findings are reviewed on video game playing, expertise in board games, expertise in music or sport and associated brain processing, as well as other forms of professional expertise. Finally, the chapter concludes by describing potential avenues of future research and application of these results in learning environments.

12.2 Primate Visual System: Hard-Wired or Plastic?

It would be beyond the focus of this chapter to provide a complete description of the neural basis of primate vision. Several text- and handbooks exist that summarize our knowledge about primate vision (Werner and Chalupa 2013). In the context of perceptual learning it is important to understand how visual information is first encoded in the retina and how this information is projected from the left and right eyes to form binocular representations of the two visual hemifields (Fig. 12.1). The axons of the retinal ganglion cells bifurcate in the optic chiasma, where fibers emanating from the nasal hemi-retina cross to the contralateral

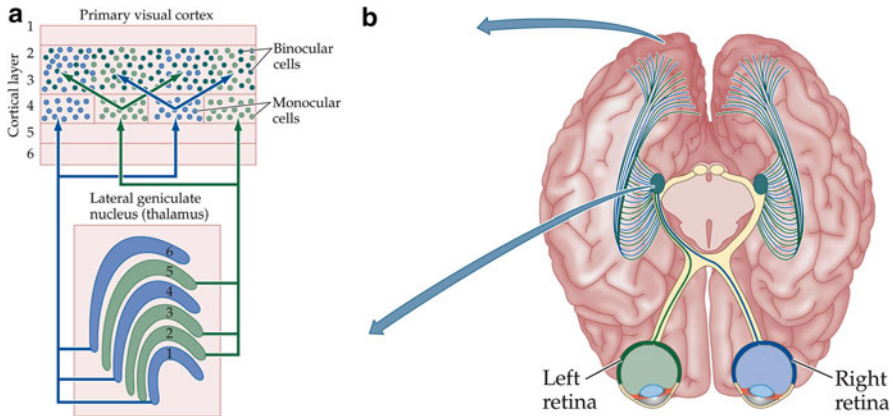


Fig. 12.1 Wiring diagram of the human visual system (a) with projections schematically illustrated from the left and right eyes to the LGN and the primary visual cortex (b) (From Purves et al. (2008). With permission)

hemisphere while those stemming for the temporal hemi-retina remain ipsilateral. Ganglion cell fibers from the contralateral eye project into layer 1, 4 and 6 of the lateral geniculate nucleus (LGN) of the thalamus, where those from the ipsilateral eye project into layers 2, 3 and 5 of this nucleus. The ventral two layers 1 and 2 are populated by cells with large cell bodies and are thus referred to as the magnocellular layers of the LGN, where the dorsal layers 3 to 6 are populated by cells with small somata and are thus called the parvocellular layers. Anatomical studies suggest that the magnocellular layers of the LGN receive input for the large parasol cells in the retinal ganglion cells and these neurons, in turn, get their input primarily from the rod photoreceptors. The parvocellular layers receive their input from retinal midget ganglion cells which process information from the cone photoreceptors, primarily from the long- and middle-wavelength sensitive cones (Lee et al. 2010). The intermediate zones that lie between the six layers of the LGN are referred to as the koniocellular layers. These LGN neurons receive input from the shortwave sensitive receptors.

The LGN neurons project via the optic radiation into the primary visual cortex, specifically into lamina IV of the visual cortex. Projections from the left and right eye form an orderly structure referred to as the ocular dominance columns, which were explored by Wiesel and Hubel (1963) in young kittens and depicted anatomically by LeVay et al. (1980) in monkeys. The existence of ocular dominance in human visual cortex has been verified using high-resolution functional magnetic resonance imaging (fMRI; Cheng et al. 2001).

The pattern of ocular dominance columns is illustrated in monkeys with normal binocular visual experience in Fig. 12.2a. This pattern of staining is achieved by

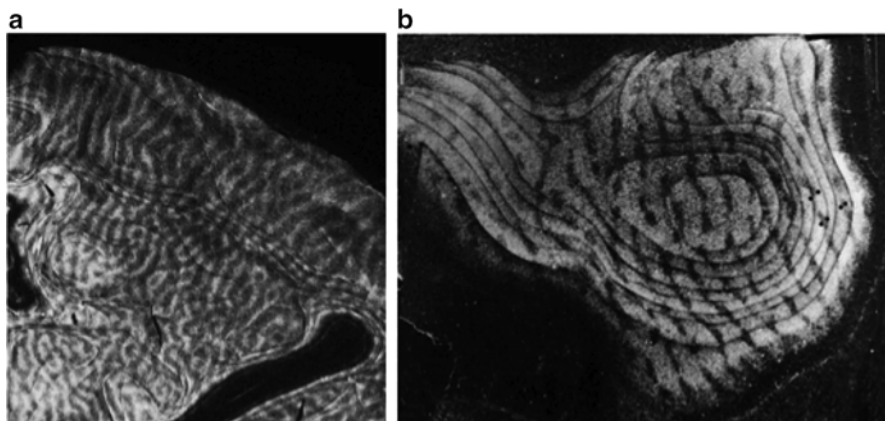


Fig. 12.2 Illustration of silver staining pattern in the primary visual cortex related to the ocular dominance columns in macaque monkey. The pattern of ocular dominance columns in normal binocular development (**a**) is compared to that found in monocularly deprived animals (**b**) (From LeVay et al. (1980). With permission)

treating one of the eyes with a silver stain that is transported anterograde along the optic tract from the one eye into the recipient parts of the primary visual cortex. The striped appearance of the cortex reflects the pattern of projections from the one eye into the cortex. Layer IV of the primary visual cortex is populated by cells that respond primarily to input from the one or the other eye. Early visual deprivation induced by closing the eyelid over one eye leads to an abnormal pattern of ocular dominance columns (Fig. 12.2b). The deprived eye has a much weaker representation in layer IV of primary visual cortex, as can be seen in the reduced stripes associated with that eye. The consequence of such early monocular deprivation is a loss of visual acuity in the deprived eye (referred to as amblyopia) and a complete loss of binocular disparity perception.

Normal adult vision is characterized by a distribution of cells that vary in their responses to stimulation from the left or right eyes (Fig. 12.3a). Based on a 7-point scale, some cells in the superficial layers of the visual cortex show a preference for the contra (1) – or ipsilateral (7) eye, whereas the large majority of cells can be driven by input from either eye (2–6 along the abscissa in Fig. 12.3a). This distribution of preference for input from the one or the other eye is significantly altered by early deprivation (Fig. 12.3b), shown here schematically for the kitten (Wiesel and Hubel 1963; Löwel et al. 1998). These changes in the pattern of ocular dominance columns demonstrate the striking nature of visual experience in shaping the connectivity between neurons in the visual cortex. Early monocular deprivation can lead to amblyopia, which is a loss of acuity and high-resolution form vision in the deprived (squinting) eye. Extensive research points to a sensitive period in the development of the visual system

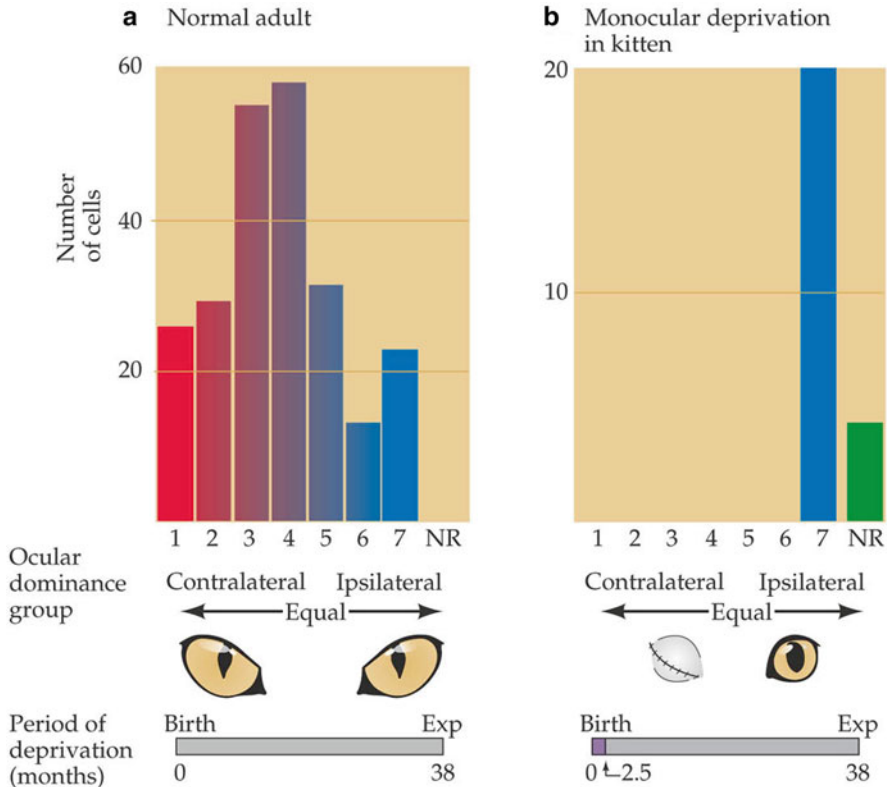


Fig. 12.3 Distribution of ocular dominance in cat visual cortex ($n=233$ cells) is shown schematically. The normal adult cat exhibits a near normal distribution of preference for input from the contralateral to ipsilateral eye (a). Cells in a monocularly deprived cat (induced by placement of a translucent contact lens over the right eye at birth) that respond only to input from the untreated left eye (b). The period of deprivation was restricted to the first 2.5 months of life. Taken from Purves et al. (2004) after Hubel and Wiesel (1962) and Wiesel and Hubel (1963) panels a and b, respectively. NR: cells that did not respond to stimulation of either eye of a 2-month old kitten (From Purves et al. (2008). With permission)

where balanced stimulation from both eyes leads to the normal development of ocular dominance columns and binocular vision. Some evidence suggests that training on perceptual tasks can have some beneficial effects on acuity in the amblyopic eye (Levi and Li 2009). In summary, there seems to be a critical period, where absence of appropriate stimulation leads to irreparable impairment in sensory function and perception. After the critical period, vision can still be altered by experience, but these changes are less pronounced than those observed prior to the end of the critical period.

12.3 Perceptual Learning of Visual Function

Performance on visual discrimination tasks can improve with practice (Fahle and Poggio 2002). Training a specific visual discrimination ability exhibits selective improvements on, for example, hyperacuity tasks, i.e. the ability to discriminate whether two vertically aligned bars are offset to the left or right. However, this learning-induced improvement in performance does not transfer to similar tasks with different orientations (Poggio et al. 1992), suggesting that the improvement in performance can be very specific for the trained stimulus feature. Perceptual learning effects can also be retinotopically specific: learning a task in one visual quadrant leads to performance increases in that quadrant but to little transfer to other quadrants (Karni and Sagi 1993). Monocular training with one eye does not transfer to post-training testing when the participants use the untrained eye (Karni and Sagi 1991), suggesting that perceptual learning and neural plasticity alter sensitivity of neurons in early stages of visual processing (see, however, Mollon and Danilova 1996). Thus, it seems that the benefits from practice are limited to the neurons involved in the original training. There is an extensive literature on various aspects of perceptual learning and neural models (involving synaptic reweighting and over-fitting) that, owing to space limitations, cannot be reviewed in this chapter. The interested reader is referred to the edited volume by Fahle and Poggio (2002), as well as other, more exhaustive, reviews (Fine and Jacobs 2002; Fahle 2005; Sagi 2011).

12.3.1 *Effects of Reward, Dopaminergic Innervation and Feedback on Perceptual Learning*

As is known from operant conditioning and reinforcement learning (Sutton and Barto 1998), rewards reinforce the association between a stimulus and a response to that stimulus and thus increase the likelihood that the response will be made again. Feedback or knowledge of result is a form of cognitive reinforcement, where the participant is given information (either trial by trial or block-wise) regarding whether the participant's response was correct or incorrect (Gopher et al. 1994; Herzog and Fahle 1997). Can rewards lead to an improvement in perceptual learning? Evidence for a possible link between reward and neural plasticity in auditory cortex suggests that temporally synchronized reward signals evoked by microstimulation in dopaminergic neurons in the ventral tegmentum area can indeed lead to a sensitization of neurons in auditory cortex (Bao et al. 2001). Coupled stimulation led to a larger response in auditory cortex for the stimulus frequency band associated with microstimulation (Fig. 12.4). These findings support the role of dopaminergic projections to sensory cortex in shaping the sensitivity of sensory neurons to repeated stimulation. Dopaminergic neurons in the substantia nigra of monkeys, which received large or small rewards for correct responses in coherent motion tasks of varying difficulty, exhibit a positive relationship between firing rate and the predicted reward (Nomoto et al. 2010). In the fMRI study of Daniel and Pollmann (2010) participants learned to

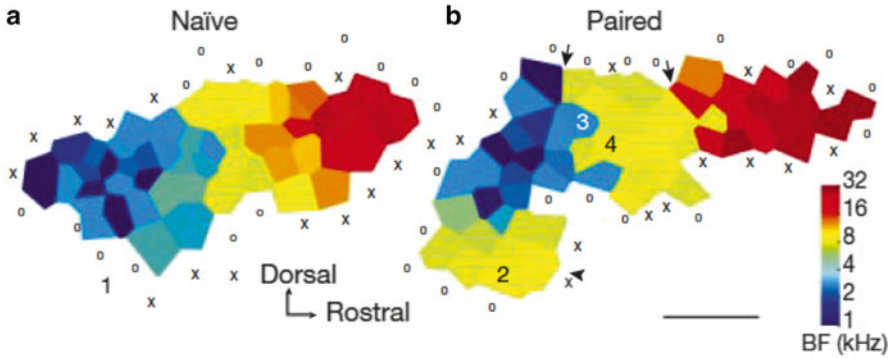


Fig. 12.4 Tonotopic distribution of cells in primary auditory cortex in the rat is depicted. Following stimulation with a 9 kHz tone paired with microstimulation in the VTA, the region preferring the 9 kHz band significantly increases from the naïve (a) to the treated rats (b). Note also an additional region of activation (in yellow) representing cells that become responsive to the trained frequency (After Bao et al. (2001). With permission)

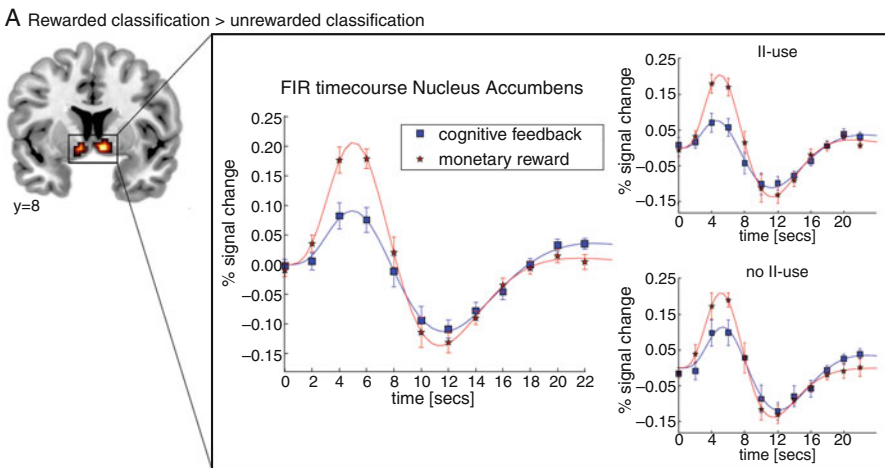


Fig. 12.5 Activation time course of the nucleus accumbens on correct trials where participants received monetary rewards (20 Euro cents) for each correct response (red curves) compared to trials where the correct response was merely signalled via a green-coloured disk (blue curves). Participants who optimally integrated information about the stimulus categories (II-use) show more pronounced difference in haemodynamic responses in the monetary reward and cognitive feedback conditions (upper right) compared to participants who did not make optimal use of this information (lower right) (After Daniel and Pollmann (2010). With permission) (Color figure online)

classify by trial and error visual stimuli (Landolt C and dual bars) that varied in line thickness and orientation. Correct performance was either fed back visually or rewarded monetarily. The nucleus accumbens, a dopaminergic structure in the mid-brain, and the caudate nucleus were significantly more active on trials with monetary rewards (Fig. 12.5). The anterior cingulum responded in a differential manner to

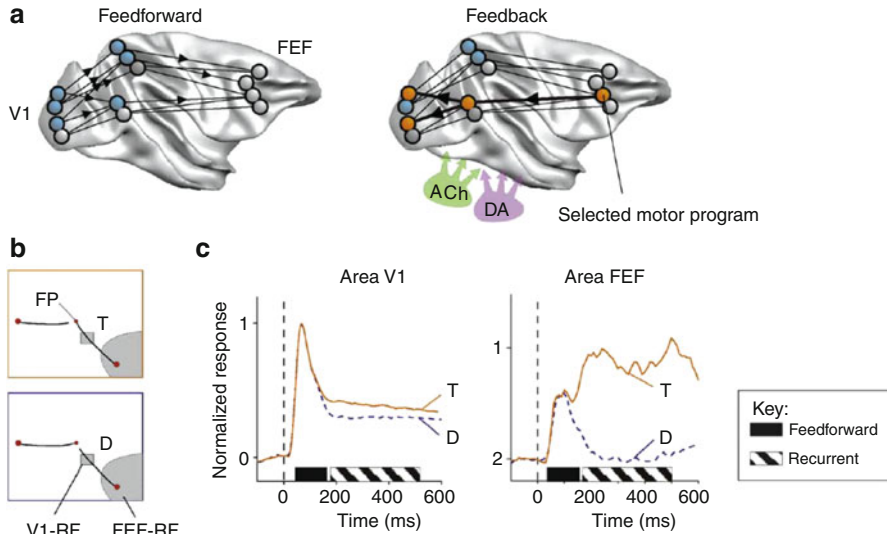
positive and negative feedback. Direct reward has a larger effect on brain activation than does cognitive feedback (i.e. knowledge of result). Trial-by-trial feedback led to more activation in the caudate nuclei in participants performing a phonological recognition task (Tricomi et al. 2006). In a recent fMRI study, Amiez et al. (2013) gave participants varying levels of juice reward while they learned by trial and error to classify abstract images. Their results point to the mid-cingulate/paracingulate cortex as an important cortical area that evaluates feedback and its associated rewards. A model for how reward signals can enhance learning of task-relevant and task-irrelevant aspects of task performance has been proposed by Seitz and Watanabe (2005).

Using multivariate pattern analysis and machine-learning classification algorithms, Kahnt et al. (2011) showed that perceptual learning in an orientation discrimination task was associated with an increase orientation-specific information in the anterior cingulum. The anterior cingulum could contain the information required to make optimal decisions based on the incoming sensory information.

12.3.2 Role of Gated Attention on Perceptual Learning

Roelfsema and colleagues (2010) have recently put forth a theory of attention-gated reinforcement learning (AGREL), according to which a reward-based neuromodulatory signal enhances responses in all active synapses and a selective attention mechanism that selectively tunes the sensitivity of synapses responsible for the behavioural response (see Fig. 12.6). According to this model, during perceptual learning changes in synaptic strength only occur in those synapses that receive the top-down attention-based signals. Visual stimulation leads to activation in prefrontal cortex via feed-forward connections. The neurons that dominate send feedback signals back to visual cortex leading to response enhancement. Reinforcement learning strengthens the synaptic weights that represent the critical feature or combination of features underlying the perceptual task, thereby leading to an improvement in performance.

Can perceptual learning take place in the absence of attention? This question was addressed by Watanabe et al. (2001), who used a rapid serial presentation task (RSVP) to resolve this issue. In this task a total of 10 letters were presented sequentially on a 1° grey disk, each letter for 33 ms. Two light-grey letters were presented serially among eight dark-grey letters and the participants were asked to type in the two grey letters at the end of each trial. In the background, task-irrelevant random dots moved in random directions (Fig. 12.7a). Unbeknown to the participants, 5 % of the dots moved in a coherent direction and this direction was coupled to the onset of the light-grey target letters. Despite the fact that the coherent motion direction was “invisible” to the participants, after repeated exposure to these dynamic displays, their performance at post-test improved for the motion direction coupled to the onset of the target letters. This finding suggests that perceptual learning can take place in the absence of feature-specific attention, in this case, in the absence of attention to the coherent dot motion, which was sub-threshold and thus invisible to the



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Fig. 12.6 Activation of neurons in primary visual cortex of macaque monkeys that are trained to respond to a saccadic target in a curve-tracing task is depicted. A hypothetical network of activated (*blue circles*) neurons in V1 that project to prefrontal area FEF (frontal eye fields) in the target-distractor discrimination task (**a**). Positions of receptive fields of V1 and FEF neurons are depicted in grey (**b**). FP=fixation point, T=target, D=distractor. Normalized responses in V1 and FEF neurons are presented as a function of time during the feed-forward (*black horizontal bar*) and recurrent, feedback (*striped bar*) phases of the response (**c**). Approximately 200 ms poststimulus onset, the response curves begin to differ for the neurons that respond either to the target of the distractor on different trials (locations shown with respect to fixation point). The monkey discriminates which of two possible saccade targets are connected by a line to the central fixation point. Activations in FEF are suppressed to the distractor but are enhanced to the target during the presaccadic phase. Dopaminergic and cholinergic signals from the substantia nigra and ventral tegmentum area reinforce synaptic connections that lead to a successful response (*orange circles* in (**a**) (*right side*)) (After Roelfsema et al. (2010). With permission) (Color figure online)

participants. Tsushima et al. (2006, 2008) varied the strength of the task-irrelevant motion stimulus and discovered that only motion coherence levels near the detection threshold led to significant direction-specific learning. According to the model of Roelfsema et al. (2010) this form of perceptual learning only takes place for near threshold stimuli (Fig. 12.7). Motion stimuli with a high level of direction coherence lead to inhibition from prefrontal cortex to neurons that are stimulated with the motion direction paired to the target presentation in the RSVP task. These studies strongly suggest that near-threshold stimuli can be learned without conscious awareness of the presence of these stimulus cues (*in casu* coherent motion directions). Important is the close timing between task-relevant and task-irrelevant cues to allow directed attention to gate reward signals (Seitz and Watanabe 2003).

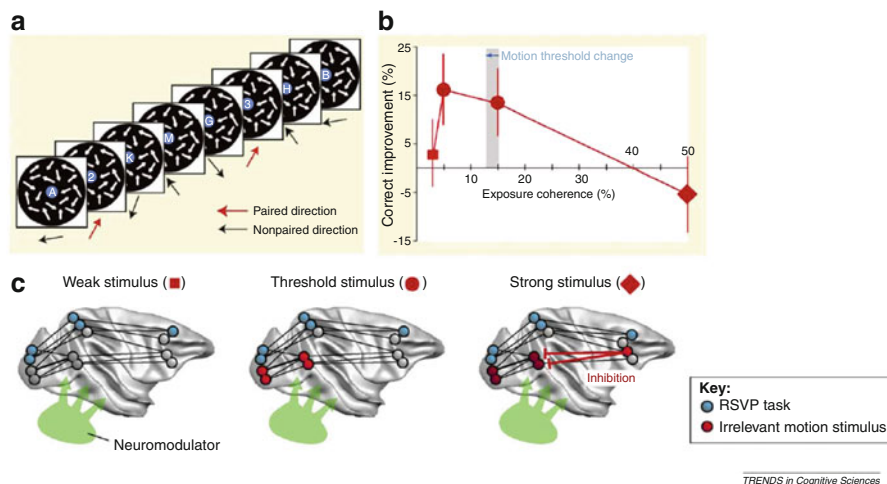


Fig. 12.7 Modified RSVP digit detection task as used by Tsushima et al. (2006). (a) Schematic illustration of the RSVP task (digit identification) embedded in the task irrelevant random-dot motion stimuli (white arrows on black annulus signify dot motion). In this paradigm the task-irrelevant dot motion was varied in coherency level from subthreshold (red square in b) to near threshold (red circles in b) to suprathreshold (red diamond in b) levels. Post-training improvement in performance during motion-detection is plotted as a function of the task-irrelevant motion coherence level during original training. (c) The results suggest that inhibitory feedback signals (red circles in c) are triggered by the suprathreshold coherent motion direction, leading to a relative decline in performance (After Roelfsema et al. (2010). With permission) (Color figure online)

12.3.3 Enduring Changes in Occipital Cortex After a Week of Training

Recently Frank et al. (2014) found long-lasting changes in visual cortex after extensive training on a visual search task for a feature-conjunction. Over a period of 8 days participants were trained to find a red-green target disk amongst an array of green-red distractor disks. All training sessions were carried out with fMRI-scanning to relate behavioural learning effects to changes in neural activation. Participants showed improved task-performance over the course of training (Fig. 12.8a). This improvement was correlated with increasing activity in visual cortex (Fig. 12.8b). Even after 9 months without any further training behavioural performance was still high and was underpinned by increased activation of visual cortex. Interestingly it was found that the difference in activation for target vs. distractor stimuli also increased with learning suggesting a higher neuronal signal-to-noise ratio as a potential mechanism for target vs. distractor feature-conjunction learning.

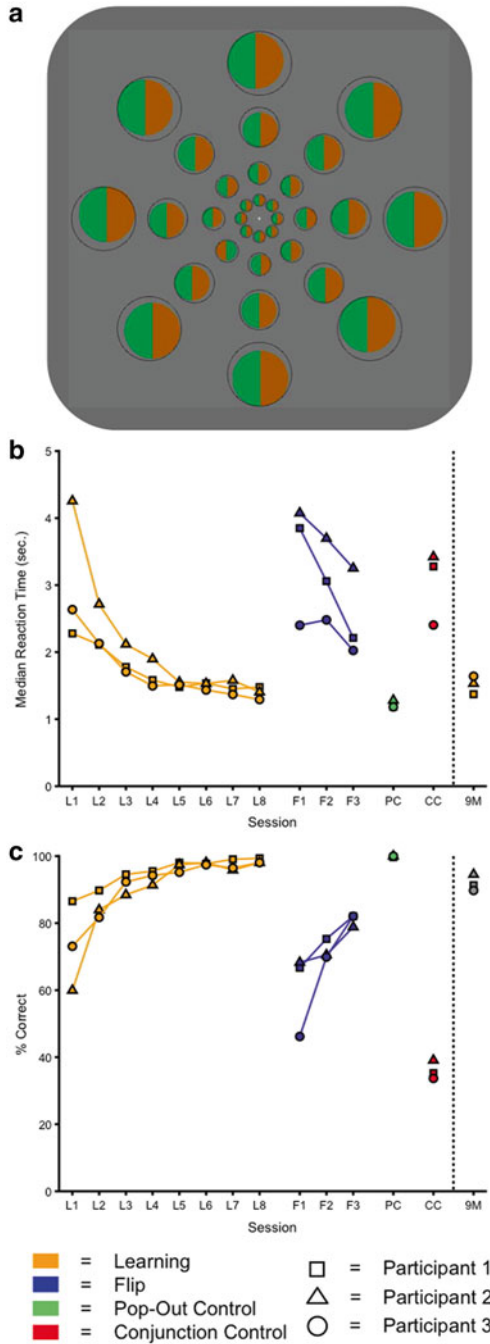


Fig. 12.8 *Left panel:* Example of the visual search task used by Frank et al. (2014). Participants had 4 s to find the red-green disk among the green-red distractors (in this example, the red-green

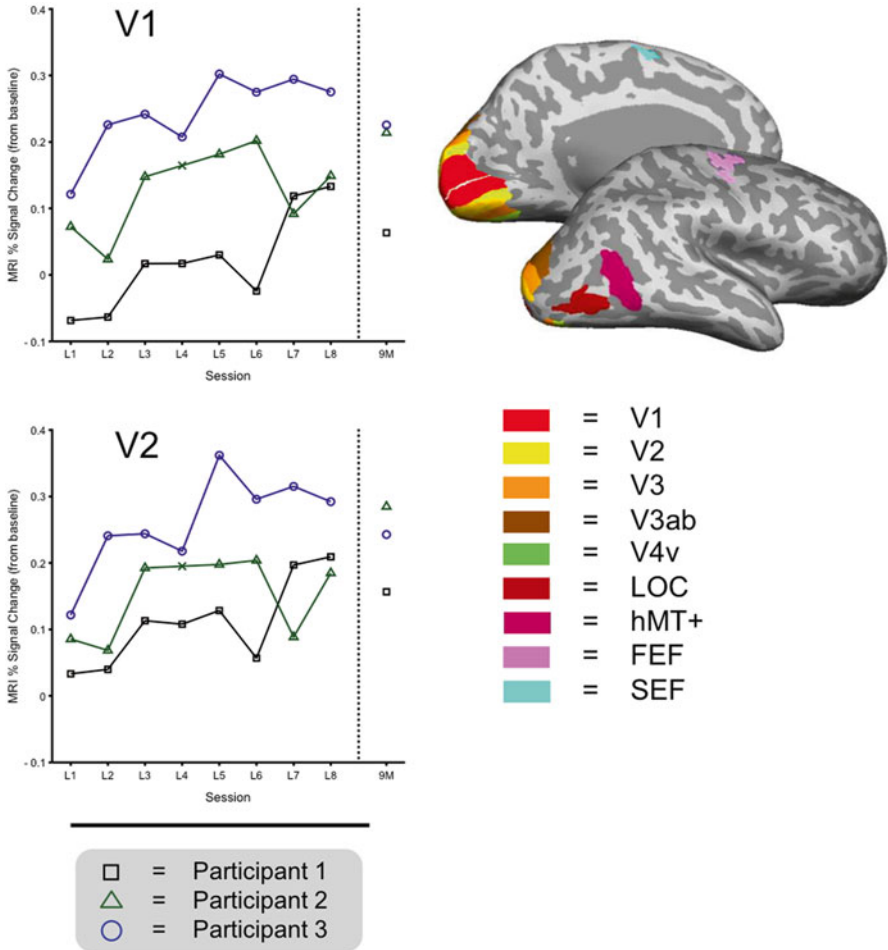


Fig. 12.8 (continued) target is in the second innermost ring). **(b)** Reaction times for the three participants during 8 days of training (*orange symbols*) decrease with learning. The specificity of learning was examined by flipping the target features with those of the distractors and vice versa (target is now *green-red* and the distractors are *red-green*; see *blue symbols* in **b**). Reaction times increase abruptly and learning must start again. The *green symbols* show the results for an easy pop-out search task that requires no training, while the *red symbols* present the results for a difficult conjunction search task that was not trained on. The *rightmost orange symbols* present the results of a follow up measurement 9 months after training ceased. **(c)** As for panel **b**, except now for performance values (percentage correct). *Left panel*: MRI-signal (percentage signal change) in primary (V1) and secondary (V2) visual cortex for the three participants as a function of the learning days (L1–L8), as well as at follow up 9 months after training ceased (Color figure online)

12.3.4 Role of Cholinergic Processes and the Effects of Sleep on Perceptual Learning

As described above, perceptual learning is a form of non-declarative learning that involves experience-dependent plasticity in sensory cortices. The cholinergic system is known to modulate declarative learning in explicit memory tasks. Reduced levels of the acetylcholine facilitate declarative memory consolidation (Hasselmo 2006). Microstimulation of the cholinergic nucleus basalis paired with auditory stimulation leads to a reorganization of the tonotopic map in primary auditory cortex in rats (Kilgard and Merzenich 1998) and guinea pig (Bakin and Weinberger 1996). Such reorganization could represent the neural substrate of perceptual learning. Rokem and Silver (2010) found that the cholinesterase inhibitor donepezil enhanced perceptual learning in humans.

The role of the cholinergic system in memory consolidation in perceptual learning was recently explored by Beer et al. (2013). These authors compared performance of two groups: one group chewed nicotine-containing tobacco for 1 h directly after training on a visual texture discrimination task (Karni and Sagi 1991), while the other group chewed a similar tasting placebo substance. On the following day, both groups showed improved performance and reduced reaction times, but the learning effects were more pronounced in the group that consumed nicotine. By enhancing the efficacy of nicotinic acetylcholine receptors implicit memory consolidation was facilitated. Beer et al. (2013) conclude that the cholinergic system promotes memory consolidation in perceptual learning.

The effects of sleep have been documented for both implicit and explicit forms of memory. Perceptual learning and implicit memory consolidation can be facilitated by sleep (e. g., Aeschbach et al. 2008; Karni et al. 1994; Mednick et al. 2003; Yotsumoto et al. 2009). Memory consolidation in perceptual learning is also promoted by rapid-eye-movement (REM) sleep (Karni et al. 1994). Hasselmo (2006) proposed that a reduction in acetylcholine levels during slow-wave sleep (SWS) suppresses afferent signals and enables excitatory cortical feedback thereby promoting memory consolidation. Declarative memory consolidation during sleep is blocked by the cholinesterase inhibitor physostigmin (Gais and Born 2004). In summary, this suggests that higher levels of acetylcholine are beneficial for perceptual learning but disadvantageous for declarative memory consolidation.

12.4 Procedural Learning

As noted in the introduction, procedural learning is related to a training-induced improvement in motor tasks. What are the neural correlates of these training-induced improvements in performance? Karni et al. (1995) asked their subjects to perform two different finger-tapping sequences in the MR scanner. Only one of these sequences was trained. The trained sequence led to a larger BOLD response

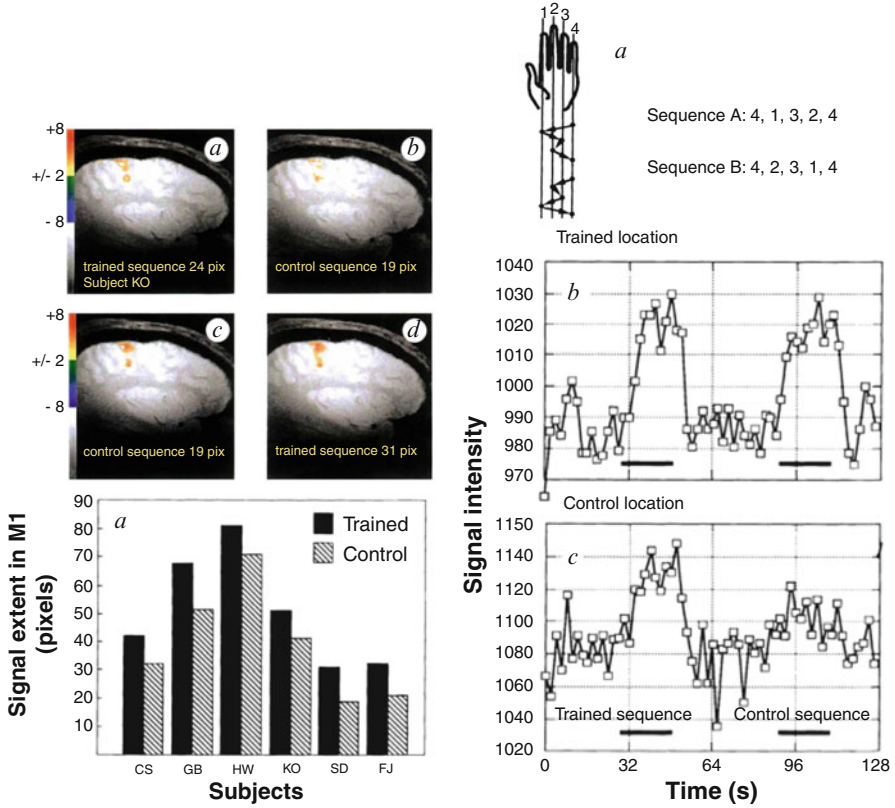


Fig. 12.9 Summary of the results from Karni et al. (1995). Brain activity was recorded using fMRI in individual participants who were trained to perform a speeded finger-tapping sequence (*upper right*). Following training, more voxels in primary motor cortex (M1) were activated during the trained compared to an untrained sequence (*upper left*). Signal extent in M1 of six participants is shown for the trained (*black bars*) and untrained (*striped bars*) tapping sequences (*lower left*). Time course of the haemodynamic response in individual voxels of M1 for trained and untrained sequences at trained and control locations (*lower right panel*). Whereas the activation at the trained location is comparable for both trained and control sequences, the response to the trained sequence is relevantly more robust at the control location, reflective of a neural recruitment process after learning (After Karni et al. (1995). With permission)

recruiting more grey matter (Fig. 12.9) compared to the control sequence that was not trained. A comparison of the time course of single voxels in the trained and control activation sites in primary motor cortex suggested a recruitment of neurons that respond to the trained tapping sequence. These early fMRI results suggest that procedural learning induced by weeks of motor training leads to changes in the fMRI response pattern in motor cortex. Repetitive transcranial magnetic stimulation (rTMS) over contralateral motor cortex applied after participants practiced finger movements eliminated all benefits of prior motor practice without impairing the ability to learn the task with further practice (Muelbacher et al. 2002). These latter

results suggest that primary motor cortex is essential in implicit memory consolidation for learned skilled movements.

Poldrack et al. (1998) and Kassubek et al. (2001) trained participants to read mirror script. Before and after training, fMRI was recorded while participants silently read normal and mirror-script words. The findings of both studies point to larger activations in visual and parietal cortex for words presented in mirror compared to normal script (Fig. 12.10). After training the overall activation for mirror script was

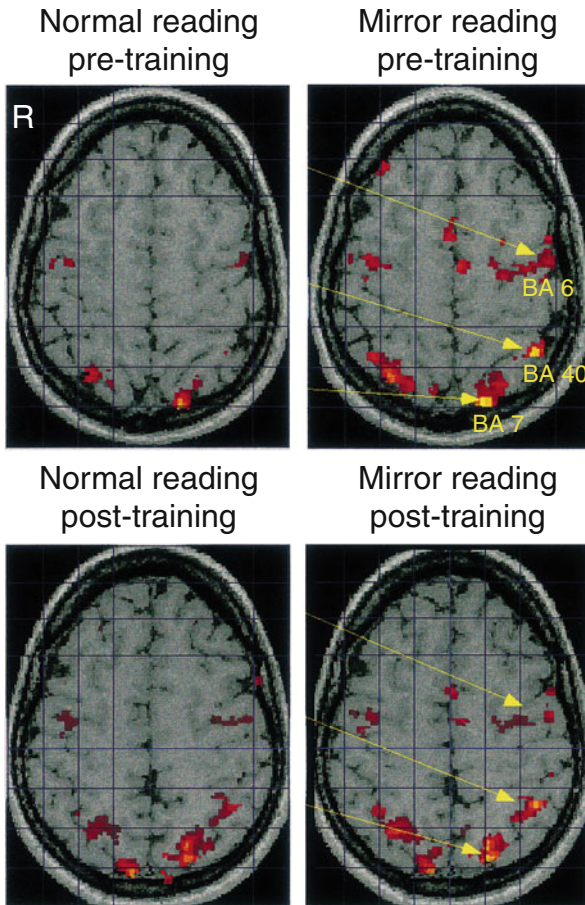


Fig. 12.10 Summary of the results from Kassubek et al. (2001). Brain activity was recorded using fMRI in individual participants who were trained to perform a mirror-script reading task (*left panel*). The brain activity was compared in each individual before and after a 1-day training period for the trained mirror script and for normal script reading. Following training, less activity was found for areas activated during mirror script reading (*black bars, right panel*). Mean results are presented for six regions of interest (BA6 representing the frontal eye field, BA7 and BA40 representing posterior parietal cortex, BA17–BA19 representing visual cortex for the left and right hemispheres (After Kassubek et al. (2001). With permission)

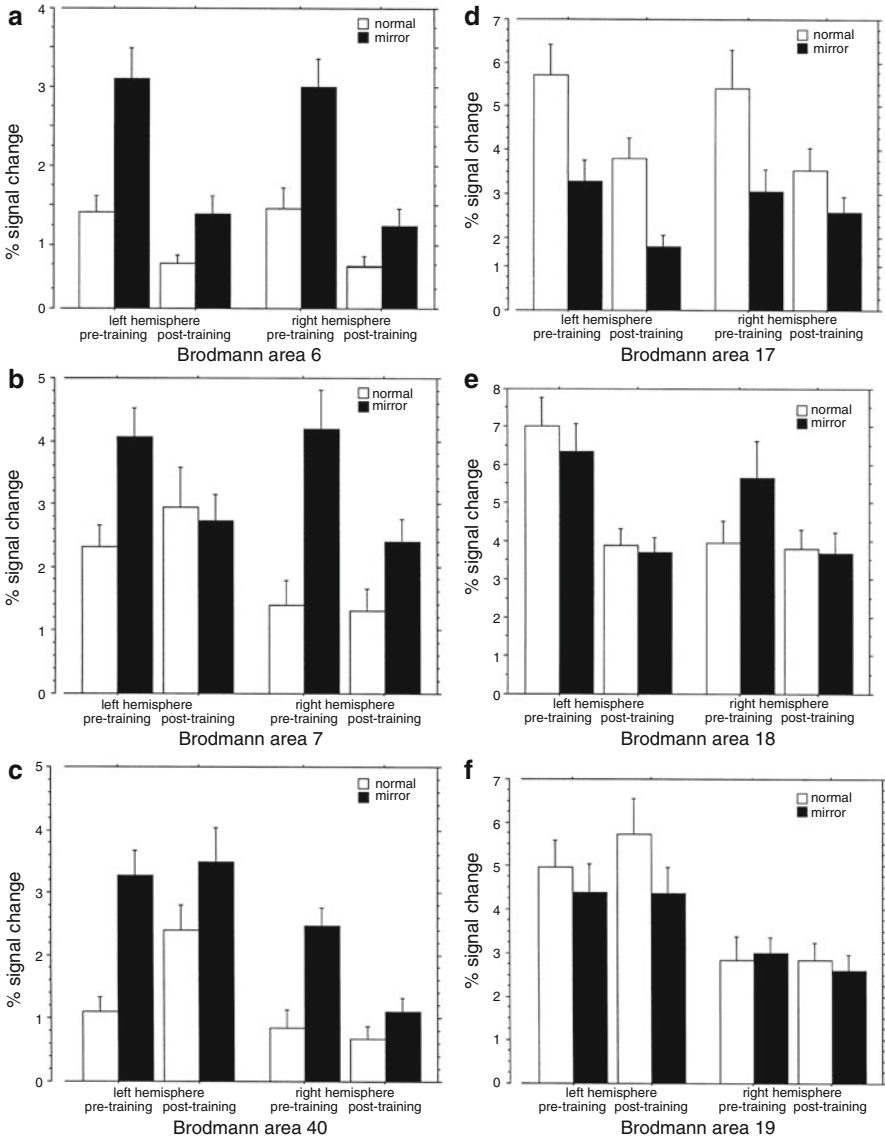


Fig. 12.10 (continued)

reduced and was in most cases no longer significantly different than that recorded during normal script reading. Kassubek et al. (2001) suggest that these results support the idea that procedural learning leads to automatic processing of the learned material and thus to lower responses in the activated brain regions. Similarly, Poldrack et al. (1998) reported mirror-reading skill acquisition to be related to decreases in activations in parietal and occipital cortex. In a review Poldrack (2002)

surveyed the results of several studies that assessed brain activation changes after visual skill learning. He concludes that perceptual skill learning is associated with an increased activity in the ventral visual stream including inferior temporal gyrus and fusiform gyrus, increased activity in the caudate nucleus and reduced activation in the dorsal stream including occipito-parietal regions.

Morse code is way to transmit individual letters of text via a combination of on-off dashes and dots, either as a series of tones (auditory) or flashes (visual). The interpretation of Morse code is an interesting skill that can be learned over a period of a few weeks. Schmidt-Wilcke et al. (2010) performed a combined longitudinal functional and morphometric magnetic resonance imaging (MRI) study on healthy volunteers who learned to decipher auditory Morse code. They investigated 16 healthy subjects using functional MR imaging and voxel-based morphometry (VBM) before and after the participants had learned to acoustically decipher Morse code. The same set of Morse-code signals was presented to the participants pre- and post-training. The authors found a post-training increase in task-specific neural activity in brain regions known to be critically involved in language perception and memory, such as the inferior parietal cortex bilaterally and the medial parietal cortex during Morse code deciphering. Furthermore they found an increase in grey matter density in the left occipito-temporal region, extending into the fusiform gyrus after learning. Anatomically neighbouring sites of functional and structural neuroplasticity were revealed in the left occipitotemporal/inferior temporal cortex, but these regions only marginally overlapped. These findings are interesting because they show that procedural learning is accompanied not only by activation increases in the underlying neural structures but also by anatomical changes in grey matter density (Fig. 12.11).

In a highly cited study, Draganski et al. (2004) trained volunteers to juggle three balls. Before and after training, as well as 3 months after the end of training, these authors determined the morphometric changes in grey matter of the brain. They found increases in grey matter in the region in extrastriate visual cortex known to underlie our ability to perceive visual motion (Fig. 12.12). The grey matter increases were less pronounced but still evident 3 months after the end of training. These results point to the ability of the adult brain to modify itself in response to prolonged sensorimotor training.

These experiments point to the changes that take place in the human brain as a consequence of acquiring a new motor skill such as juggling (Draganski et al. 2004; Draganski and May 2008), deciphering Morse code (Schmidt-Wilke et al. 2010) or reading mirror-script (Poldrack et al 1998; Kassubek et al. 2001). The efficiency with which the brain processes task-related information improves with training. This improvement is associated with a change in the brain functional response and anatomical structures underlying these responses. A very recent study suggests that anatomical changes in white matter diffusivity can take place after only 2 h of spatial training (Sagi et al. 2012). The interested reader is referred to the review by Ungerleider et al. (2002).

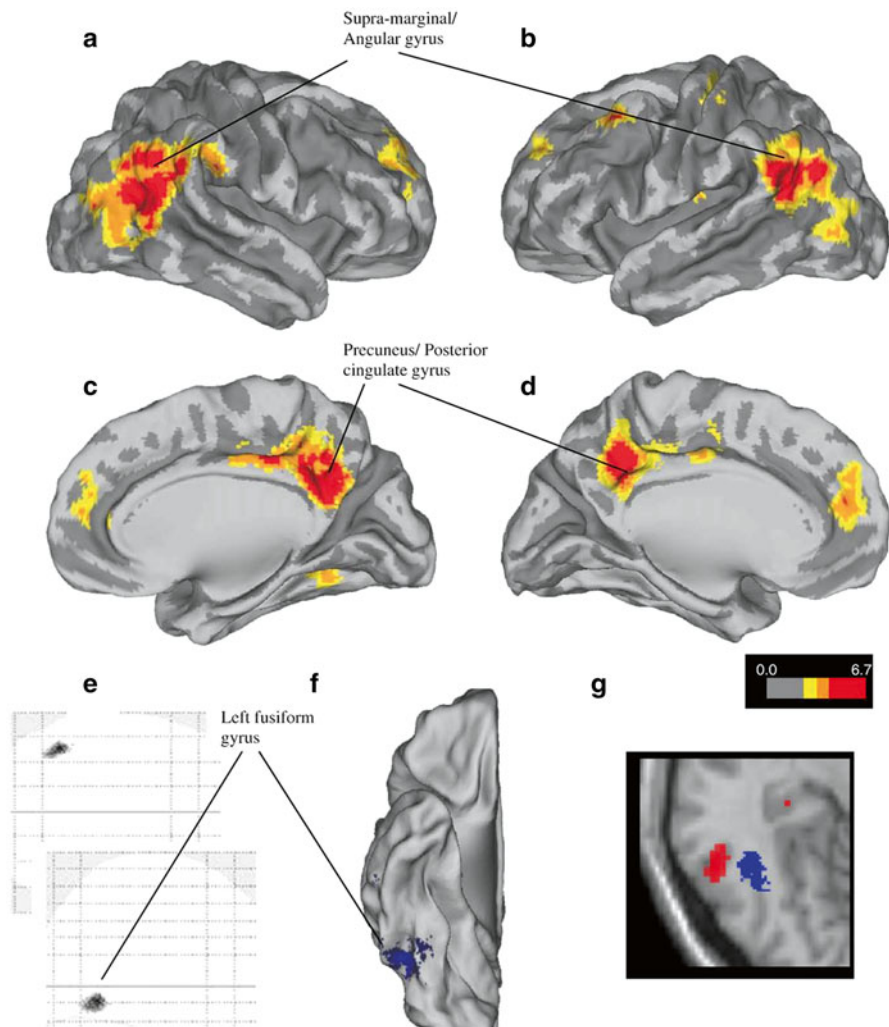


Fig. 12.11 Summary of the results from Schmidt-Wilcke et al. (2010) is presented. Brain activity was recorded using fMRI in 16 participants who were trained to decipher acoustically presented Morse code. Their results are compared to 16 control subjects who did not train to decipher Morse code. The brain activity was compared between these groups after training. Following training, more activity was found for the supramarginal and angular gyri (a, b) as well as in midline structures in the precuneus and posterior cingulate cortex (c, d). Results of voxel-based morphometry (VBM) in the trained participants compared to controls (e, f). Blue clusters denote the voxels that showed significantly more density in grey matter in the training group. The location of a cluster in occipito-temporal cortex activated during fMRI is located near the grey matter increase (g) (After Schmidt-Wilcke et al. (2010). With permission) (Color figure online)

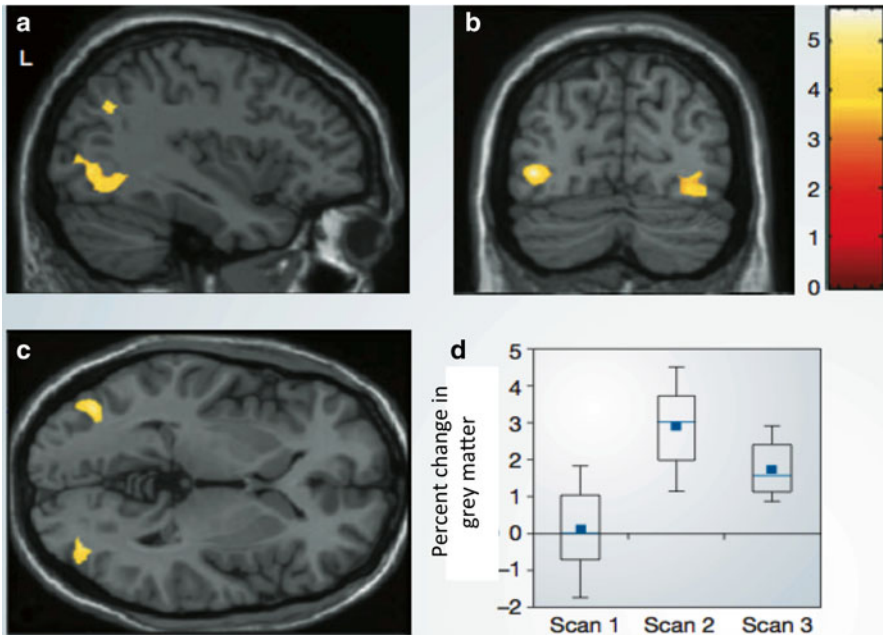


Fig. 12.12 Study of Draganski et al. (2004). Results for VBM analysis of grey matter density are shown for participants who learned to juggle three balls. Training-induced structural changes were found as bilateral clusters in extrastriate visual cortex at a neural location important for visual motion processing (panels a–c). Participants’ brains were scanned on three occasions and percentage change in grey matter is presented for the regions of interest shown in (a)–(c) prior to training (Scan 1), after training (Scan 2) and 3 months after cessation of training (Scan 3) (d) (After Draganski et al. (2004). With permission)

12.4.1 Video Game Playing, Dopaminergic Transmission and Training Strategies

Habitual video-game playing has been associated with enhanced contrast sensitivity (Li et al. 2009) and increased visual attention capacities (Green and Bavelier 2003, 2012). Task switching costs are reduced in video-game players compared to non-players on a variant of a flanker task (Cain et al 2012), suggesting enhanced executive functioning in gamers. Higher grey matter values in the ventral striatum and a negative correlation between deliberation time in gambling tasks and striatal grey matter have been reported (Kühn et al. 2011). Evidence from ^{11}C -raclopride positron emission tomography points to an enhanced dopaminergic transmission during video-game playing and a significant correlation between ^{11}C -raclopride binding potential and task performance (Koepp et al. 1998). A replication study (Egerton et al. 2009), while revealing similar trends, points to possible confounding effects of regional cerebral blood flow and head movements, suggesting caution while interpreting these results. A 15-week training program with the Japanese board game shogi led to

significant increases in the fMRI-signal in the head of the caudate nucleus (Wan et al. 2012). In summary, video-game playing has some positive effects on visual processing. Dopaminergic signalling in the ventral striatum and the caudate nucleus might be important causal factors promoting visual and cognitive functioning.

Training strategies can also impact on learning with video games. Comparing two different training strategies (i.e., variable-priority versus full emphasis), Lee et al. (2012) reported significant differences in superior frontal gyrus and precuneus between the groups. The participants who trained according to the variable-priority approach (placing an emphasis on part skill acquisition) outperformed the full-emphasis (emphasizing the entire skill sequence) and control groups. Interestingly, the variable-priority group showed significantly lower activations in the studied regions of interest, suggesting more efficient usage of neural capacity.

12.5 Professional Expertise and Brain Function

Cognitive neuroscientific research has mostly been concerned with the acquisition of fairly simple types of motor performance like finger tapping or perceptual tasks that can be conducted in the fMRI scanner. Brain changes associated with more complex aspect of professional training have so far focused on detecting structural and/or functional differences in the brains of professional musicians with or without perfect pitch perception (Schlaug et al. 1995; Zatorre et al. 1998; Jäncke et al. 2012), golfers (Jäncke et al. 2009), expert versus novice badminton players (Wright et al. 2011), archers (Kim et al. 2008) and pilots (Pérès et al. 2000). These studies have revealed both differences in grey and white matter in voxel-based morphometry, as well as functional activation differences in fMRI in brain regions underlying domain-specific skill acquisition. One obvious shortcoming of these approaches is that the causality of these brain differences cannot be determined, since the participants are by definition not randomly assigned to the experimental and control groups. Longitudinal studies where the participants are randomly assigned to a treatment or control group and then followed over a longer period during skill acquisition appears to be the more promising approach (see Schmidt-Wilcke et al. 2010, discussed above). First studies using this approach are appearing and point to significant changes in structure and function in the brains of participants who learn a new foreign language over a 9-month period (Schlegel et al. 2012), or who practice meditation techniques (Allen et al. 2012), or motor sequences (Steele et al. 2012).

12.6 Learning by Doing Versus Learning by Viewing

Although the studies reviewed above indicate different brain regions involved in perceptual and procedural learning, some common aspects are shared by these different types of learning. Whereas in procedural learning the emphasis is on

“learning by doing”, where a motor sequence or skilled action is practiced over and over, in perceptual learning the mere act of perceiving the critical stimulus feature in the presentation time given leads to an improvement in performance. Could skilled motor actions benefit by the mere “viewing” of the enacted motor sequence? To address this issue Nyberg et al. (2006) trained two groups of eight participants each to perform specific finger-tapping sequences. Before and after 1 week of training both groups were scanned to determine fMRI-activations during finger tapping of the learned sequence or of another (unlearned) tapping sequence, both performed with the left hand. One group physically enacted the tapping sequence repeatedly during training, whereas the other group mentally rehearsed the tapping sequences without actually enacting the sequence. Interestingly, physical and mental practice led to fairly similar patterns of activations and changes in activation in the motor/premotor cortex and cerebellum (see their Fig. 1), where activation was reduced following training. Direct comparison of the two forms of training revealed small clusters that were more activated in the supplementary motor area (SMA) after motor training and in the extrastriate visual cortex after mental training. The findings indicate that mental rehearsal alone leads to training-induced changes in brain activations.

Similar findings have been reported for activations in premotor and parietal cortex for more complex motor sequence learning required for dance, with a significant negative correlation between training gain and MRI-signal change in premotor cortex (Cross et al. 2009). The training effect on making complex finger-hand positioning while playing musical chords on a guitar was investigated by Higuchi et al. (2012) in participants who physically practiced the movements or just imagined executing the prior observed movements. Practice led to significant reductions in activation in parietal and premotor cortex, with a large overlap in the effects of physical and observational practice (see their Fig. 3).

In summary the studies reviewed above indicate that “learning by doing” and “learning by viewing” (i.e., either by real observational viewing or by mental imagining) induce robust changes in behaviour and brain activation in fronto-parietal motor networks involved in action-planning. Although physical practice shows an “enactment” advantage, mere mental or observational practice affects behaviour and brain activations in a similar way.

12.7 Critical Appraisal of the Neuroscientific Approach to Skill Learning

The advent of in-vivo structural and functional brain imaging using magnetic resonance imaging has allowed for new avenues of neuroscientific research in healthy participants, who are instructed to perform tasks while their brains are repeatedly imaged. The advantages of functional MRI over other forms of brain imaging are obvious, since it is non-invasive, requiring no radioactive tracer substances to be injected into the blood stream of the participants (as is required for positron emission

tomography). With high-field magnetic strengths of 3 T and higher, the human brain can now be studied with millimetre resolution and high precision. Reliance on the blood-oxygen level dependent signal (BOLD) has the disadvantage that the haemodynamic response lags some few seconds in time behind the actual neural activations that the researchers are interested in. However, more sophisticated experimental designs with virtual time resolutions of 1 s or less have led to more information about the dynamics of brain activations and functional or effective connectivity. Despite these obvious advantages, the reader should be careful when evaluating the results of functional brain imaging studies for the following reasons. First, the participant is highly restricted and instructed not to move his or her head at any time. Although motion correction algorithms are used to correct for residual head displacements that take place during the scan session, the fact that the head is restricted limits the types of experiments that are possible in the fMRI scanner. Second, the participant lies in the supine position while viewing visual stimuli via a restricted mirror or eyepiece and/or listening to sounds via headphones. Thus, the ability to study sensorimotor learning is often limited to stimuli that can be delivered via projection systems and headphones or to movements that can be made with the distal extremities, such as finger tapping. Postural movements of the trunk would not be feasible, since this would lead to head movements and image artefacts. Third, the participant is aware that his/her brain is being scanned and that everything experienced in the scanner is part of the cognitive or sensorimotor experiment. Immersive stimulation is difficult to obtain, restricting the realistic nature of the challenges that a participant can experience during brain imaging. Despite these limitations functional MRI has become one of the most prominent methods in modern cognitive neuroscience, leading to a huge number of studies each year that report on a brain activations for each selected experimental paradigm. With such a wide variety of studies, selective reporting can lead to biased interpretation of the evidence for or against a certain theory. First attempts to perform meta-analyses using activation likelihood estimation (ALE) for cortical activations during motor actions observation and imitation (Caspers et al. 2010; Molenburghs et al. 2012) and for cerebellar activations during visuomotor adaptation and memory tasks (Bernard and Seidler 2013) have been reported. Such meta-analytic methods will help integrate the vast literature that is accumulating with fMRI methods. For perceptual and procedural learning the current evidence suggests that learning alters the human brain structurally and functionally.

12.8 Conclusions and Implications for Learning Environments

This chapter has introduced the reader to some of the concepts used in neuroscientific research to study changes that take place in the brain during perceptual and procedural learning. These two types of implicit learning share several features. Foremost, they reflect the capacity of the adult brain to modify itself to challenges placed on it by demanding tasks. Prolonged practice can lead to striking

improvements in our ability to perceive aspects of stimuli that had gone previously unnoticed. With extensive training, trainees can learn to discriminate between tiny differences between stimuli that are very similar or have been flashed on the screen for a very brief moment. The experimental results of several laboratories are discussed as well as a model presented by Roelfsema et al. (2010) that combines the effects of dopaminergic and cholinergic rewards systems in the midbrain with sensory and decision processes through attention-gated feedback signals. Such dynamic signalling might also be involved in procedural learning, where the emphasis is placed on the motor or sensorimotor performance that increases after training. Here not only is the brain more activated following training, but morphometric analysis of the cortical grey matter suggests that the synaptic connectivity is enriched after training. Such training-dependent alterations in brain structure and function in adults indicate that the mature brain remains plastic and can benefit on the long-term from repeated practice.

These neuroscientific results have a number of potential implications for the design of learning environments. They suggest that the adult brain remains plastic and can be modified by training. To increase transfer to other tasks or stimulus configurations, these training protocols should take into account under which circumstances transfer can be expected to take place and under which training protocols learning will not transfer. These insights open up novel inroads in the area of neuro-rehabilitation by demonstrating that disorders such as amblyopia might be accessible to perceptual training protocols.

Further implications exist for training programmes used to improve professional efficiency in all sorts of industry. The results reported above suggest that feedback and reward are important during the learning process. Feedback and rewards can enhance training-induced improvements in performance. Dopaminergic and cholinergic innervation from reward centres like the nucleus accumbens or the nucleus basalis of Meynert increase dopamine and acetylcholine at the synaptic level, leading to an increase in neural transmission and increased learning.

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Glossary

¹¹C-raclopride positron emission tomography A brain imaging technique involving the radioactive isotope ¹¹C combined with raclopride to label dopaminergic brain regions.

Anterior cingulum Cortical area in medial prefrontal cortex thought to process various aspects of attention and executive control.

- Caudate nucleus** A component of the subcortical basal ganglia involved in motor control, learning, memory and other forms of cognition.
- Cholinesterase inhibitor** Or acetylcholinesterase inhibitor is a chemical substance that inhibits acetylcholinesterase enzyme from breaking down acetylcholine thereby increasing cholinergic transmission.
- Extrastriate visual cortex** Secondary visual cortex beyond the striate (stripped) cortex representing area 17 (containing primary visual cortex).
- fMRI** Functional magnetic resonance imaging, a non-invasive, in-vivo brain imaging technique.
- Fusiform gyrus** Part of the ventral visual cortex involved in object and face recognition.
- LGN** Lateral geniculate nucleus of the thalamus involved in visual processing with magno-, parvo- and koniocellular layers.
- Laminae I–VI** Six layers of the neocortex, where lamina I borders the pia mater and lamina VI the white matter.
- Mid-cingulate/paracingulate cortex** Parts of the cingular cortex in the medial neocortex.
- Nucleus accumbens** A dopaminergic structure in the midbrain thought to be involved in reward processing.
- Nucleus basalis** Nucleus basalis of Meynert: a group of neurons in the substantia innominate in the basal forebrain involved in cholinergic innervation of the cortex.
- Occipito-temporal cortex** Part of the ventral visual pathway at the junction between the occipital and temporal lobes.
- OC** Optic chiasma, a location in the brain where the optic nerves partially bifurcate.
- Physostigmin** A cholinesterase inhibitor that acts by interfering with the metabolism of acetylcholine.
- REM** Rapid-eye-movement sleep, a form of paradoxical sleep in which the person executes rapid eye movements during dream-like states.
- RSVP** Rapid serial presentation task, a visual task involving the presentation of a rapid sequence of images containing two or more targets that require a motor response from the participant.
- SN** Substantia nigra, a brain structure in the midbrain involved in motor control and reward processing.
- SWS** Slow-wave sleep, stage 3 to 4 of (deep) sleep that is associated of low frequency EEG delta waves.
- VBM** Voxel-based morphometry, a data analysis technique that determines statistical differences in grey and white matter voxel intensities. Used to measure cortical grey and white matter thickness.
- Ventral striatum** Part of the basal ganglia involving the nucleus accumbens, the olfactory tubercle, as well as the caudate nucleus and putamen.
- VTA** Ventral tegmentum area, a dopaminergic structure in the midbrain involved in dopaminergic innervation and control of attention.

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Suggested Readings

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Chapter 13

Hierarchical Linear Models for Research on Professional Learning: Relevance and Implications

Eva Kyndt and Patrick Onghena

Abstract The goal of this book chapter is twofold. Because research on professional learning using Hierarchical Linear Modelling (HLM) is scarce, the first goal of this book chapter is to familiarise the readers with HLM. The opportunities, assumptions, and limitations of these techniques will be discussed and illustrated with an authentic dataset. Secondly, this chapter will focus on the relevance and implications of HLM for research in the field of professional learning and training: Why and when should this method be adopted within research on professional learning? Which conditions should be fulfilled? What are the advantages of this technique in general and which advantages are specifically relevant for the proposed field of research?

This chapter will provide a basic introduction into HLM. HLM, also known as multilevel modelling, is a statistical technique that takes the nested structure of the data into account. First, HLM will be introduced from a conceptual point of view and discussed why and when it could be applied. Subsequently, the different steps in HLM analysis will be presented and illustrated with an authentic dataset of a study investigating employees' learning intentions. The following section will focus on prior research in the field of professional learning that applied HLM. Finally, the main conclusions and future research perspectives will be provided.

Keywords Hierarchical linear modelling • Multilevel analysis • Professional learning

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13.1 Introduction

The research field on professional learning has been growing considerably over the last decade (Billett 2008). While the field on professional learning has a long and rich tradition of applying qualitative research methods, nowadays more and more quantitative methods are being adopted to investigate the complex reality of professional learning. However the valid and relevant application of quantitative methods in this field is not self-evident: Employees with their own personal characteristics are embedded in different organisations that in turn have their own policies and characteristics. In addition, these organisations have to operate within a continuously changing society due to rapid technological changes and global competitiveness (Kyndt et al. 2009). With any method a researcher uses, it is important to keep in mind that the data collection and analysis needs to be in accordance with the complex reality that is under investigation (Goldstein 2003). Therefore, it is our opinion that the field of professional learning would benefit from applying more advanced statistical techniques that are appropriate for analysing this complex reality.

The current chapter will focus on Hierarchical Linear Modelling (HLM), which is also known as multilevel modelling. The goal of this chapter is twofold. Because research on professional learning using HLM is scarce, the first goal of this chapter is to familiarise the readers with HLM. The opportunities, assumptions, and limitations of these techniques will be discussed. Secondly, this chapter will focus on the relevance and implications of HLM for research in the field of professional learning and training: Why and when should these methods be adopted in the research on professional learning? Which conditions should be fulfilled? What are the advantages of these techniques in general and which advantages are specifically relevant for the proposed field of research? The general aim of this book chapter is to provide a basic introduction to HLM without using mathematical formulas, without making it overly complex while at the same time staying true to the complexity of the presented analysis.

In the first section of this chapter, HLM will be introduced from a conceptual point of view and discussed why and when it could be applied. Subsequently, the different steps in HLM analysis will be presented and illustrated with an authentic dataset of a study investigating employees' learning intentions. The third section will focus on prior research in the field of professional learning that applied HLM. Finally, the main conclusions of this chapter will be summarized.

13.2 Hierarchical Linear Modelling (HLM): Why and When?

In order to present HLM from a conceptual perspective, the “why and when HLM should be used” will be discussed. We will explain that when the data are nested HLM should be used. In general two types of nested data can be distinguished; individuals can be nested within different contexts, that is employees within

organisations, or multiple measurement moments can be nested within individuals in longitudinal research (Raudenbush and Bryk 2002). Subsequently, the different types of relationships and models that can be investigated will be discussed, followed by which conditions should be fulfilled to be able to execute the analysis.

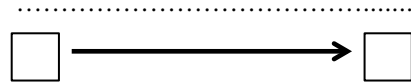
There are two main arguments for using HLM instead of regular regression analysis. The first argument pertains to the fact that the collected data need to be analysed in such a way that it takes the structure of the data into account. In other words, if the individuals from whom the data is collected are employed within different organisations – thus are nested in different organisations – then the analysis needs to take this nested structure into account. The second argument for using HLM refers to the theoretical grounding of the empirical research study. If theory and therefore hypotheses include variables at different levels then an analysis appropriate to handle these different levels is needed. For example, if theory describes that firm policy (equal for all employees of the same organisation) influences the individual job satisfaction of employees, an analysis that is able to investigate the relationship of firm policy at the organisational level with job satisfaction at the individual level is needed.

Both arguments can be related to the fact that '*ecological fallacy*' should be avoided. Ecological fallacy refers to the fact that relations are assumed to hold for individuals, whereas in reality they are observed in groups (Luke 2004). For example, research could identify that males and females differ in the number of trainings in which they participated, while in fact it is possible the differences are situated at the level of the organisation (e.g., industry, type of profession) but that some organisations have more or less female/male employees. Empirical research has indicated that occupational segregation could explain gender differences (Oosterbeek 1996; Simpson and Stroh 2002). In addition, disregarding the nested structure will lead to a higher likelihood of Type I errors. In other words, statistical relations are found that might not really exist. To ensure the reliability and validity of the findings, it is important that techniques are used that are appropriate for identifying the unique impact of specific factors at various levels (Snijders and Bosker 1999; Van den Noortgate et al. 2005).

Data collected in cross-sectional research may be nested, such as in the examples above, with individuals nested in organisations, but a specific type of nesting always occurs when performing longitudinal research. In longitudinal research, repeated measurements are nested within individuals. These models are also known as growth curve models, because researchers applying this technique are often interested in the growth trajectory of individuals (Anumendem et al. 2013; De Fraine et al. 2007; Prinzie et al. 2005). For example, research on transfer of training is concerned with the retention period of what has been learned, therefore they often use multiple measurement moments (e.g., Gegenfurtner 2013). Analysing growth curve models informs the researcher on the pattern or growth trajectory of the individuals.

The combination of both types of nesting is of course also possible; collecting longitudinal data with multiple measurement moments from individuals that are nested within different organisations. In this case an additional level is introduced in the model, resulting in a three-level model. Building further on the example of

Fig. 13.1 Level-1 relationship



transfer of training; it could be that the collected longitudinal data stem from employees coming from different organisations. Another three-level model within the context of professional learning is for example an investigation of individuals nested within organisations that are in turn branches of larger (international) companies. These examples show that HLM offers a broad range of possibilities; this chapter will however limit itself to models with two levels, for more information of HLM including three or more levels we can refer the reader to the work of Goldstein (2003) or Raudenbush and Bryk (2002). In the second part of this chapter HLM analysis will be illustrated with a cross-sectional dataset involving two levels, for a good example of HLM analysis involving longitudinal data, the reader is referred to Van den Noortgate and Onghena (2006).

13.2.1 *Types of Relationships*

HLM analysis including two levels can involve different types of relationships. Even when no level-2 predictors are included in the model, because no characteristics of the organisation were collected, HLM is appropriate for nested data. Level-2 predictors are predictors that are identical for all the individuals within each organisation. Level-2 predictors can be (objectively) measured organisational characteristics, concern information retrieved from the human resource department of the company such as training budget or an aggregate of individual perceptions. However when aggregating individual perceptions, individual variation is lost therefore one can consider including these individual perceptions as a level-1 predictor. Figure 13.1 presents a type of relationship that includes one outcome variable and one predictor at the first level in a schematic way (Pustjens et al. 2004). The squares in the figure represent manifest variables, the arrows represent the relation between the variables and the dotted line separates the two levels in the model. The main difference between an HLM analysis of this type of relationship and regression analysis is that initial overall differences in the outcome variable between organisations are taken into account; this is not the case when using regression analysis. The article of Kyndt et al. (2013) is a published example of a research study within the field of professional learning investigating this type of relationship with HLM. They investigated the relationship between different predictors at the individual level (e.g., self-directedness, perceived support, etc.) and the learning intention of low-qualified employees while taking initial differences in learning intentions of employees belonging to different organisations into account (Kyndt et al. 2013).

When level-2 predictors have been measured, it can be investigated whether these organisational characteristics explain the variation observed at the individual level. For example, it could be investigated whether the company budget for training

Fig. 13.2 Cross-level relationship

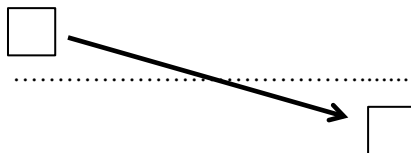


Fig. 13.3 Cross-level relationship including level-1 predictor

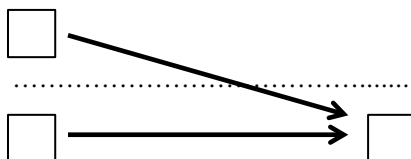
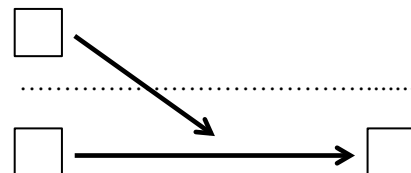


Fig. 13.4 Cross-level interaction



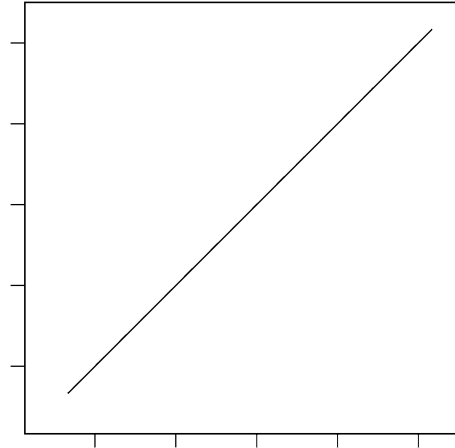
explains individual differences in participation in training. This type of relationship is called a cross-level relationship. This can be investigated apart or together with predictors at the first level. For example, company budget could be one of the predictors of training participation next to an individual’s self-efficacy (e.g., Maurer et al. 2003). Figures 13.2 and 13.3 represent these relationships (Pustjens et al. 2004).

Finally, HLM allows us to investigate whether an interaction between characteristics at the level of the organisation and characteristics at the level of the individual explain the variation in the outcome variable at the individual level. For example, the interaction between the industry in which the organisation is active and the employee’s level of education could predict the career development of employees. This relationship is known as a cross-level interaction effect and is represented in Fig. 13.4 (Pustjens et al. 2004). All figures in this section represent the relationship between manifest variables, however HLM can also be applied to latent variables (see e.g., D’Haenens et al. 2012; Muthén 1994). It is however important to point out that the outcome variables in HLM analysis need to be located at the lowest level that is included in the model. HLM analysis does not allow the prediction of a level-2 outcome based on level-1 predictors. For example, HLM cannot be used to predict the profits of an organisation based on the variation in individuals’ level of education.

13.2.2 Different Types of Models

Before the different types of models that can be investigated with HLM are explained, the notion of fixed and random coefficients (intercept and regression coefficients determining the slope) needs to be introduced. Fixed coefficients are

Fig. 13.5 Fixed intercept and slope



coefficients of which it is assumed that they hold for all cases in the data. When a coefficient is said to be random, it means that its value can vary. However, random is in itself a confusing term because it gives the impression that the coefficients can take on any value, while this is in fact not the case (Field et al. 2012). An assumption regarding these random coefficients is that they are normally distributed around the average population coefficient.

Regression analysis operates from the assumption that all parameters are fixed, that the score on the outcome variable for each individual can be predicted based on the same values of the intercept and regression coefficients. Figure 13.5 presents a traditional regression line of a model with fixed intercept and fixed slope.

Within HLM analysis the intercept, the slope or both can vary between organisations normally distributed around respectively the average intercept and slope that holds for the population. HLM is able to assess the amount of variation at each level (Raudenbush and Bryk 2002).

13.2.2.1 Random Intercept Model

Within a random intercept model the group effect is conceived as random – normally distributed around the intercept of the population – rather than fixed (Raudenbush and Bryk 2002). This type of model assumes homogeneity of the regression slopes across the different groups or organisations included in the study, in other words it assumes that the nature and strength of the relationship between the dependent and independent variables is equal across the different organisations. This model does however allow that initial differences in the overall level of the outcome variable between organisations are taken into account. Figure 13.6 presents the regression lines of the different organisations when a random intercept model is chosen.

Fig. 13.6 Random intercept and fixed slope

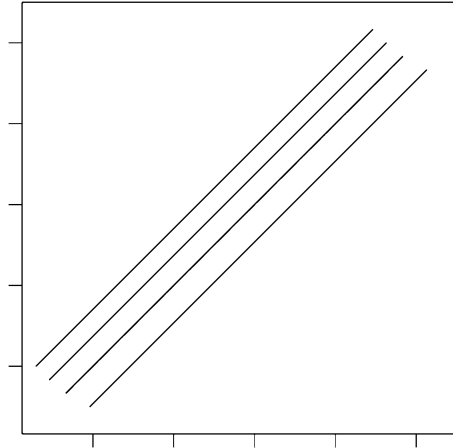
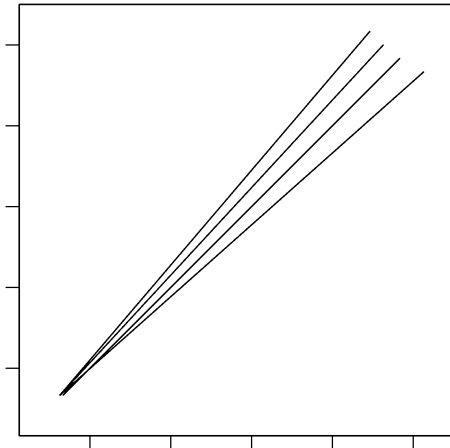


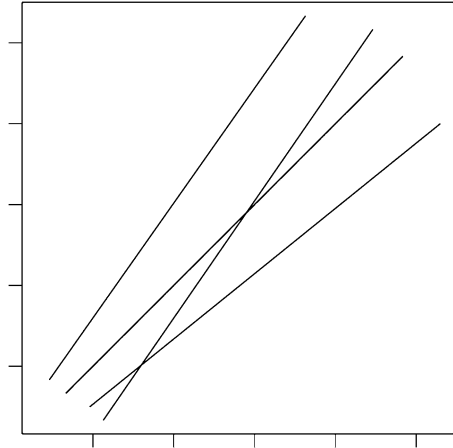
Fig. 13.7 Fixed intercept and random slope



13.2.2.2 Random Slope Model

The random slope model represents the heterogeneity of the regression slopes. With this model it is possible to investigate whether the relationship between the outcome and predictor variables differs in nature and strength across organisations. In addition, this variance can possibly be explained by means of predictors situated at the level of the organisation. This model does however assume that the intercept does not vary across organisations. Figure 13.7 illustrates this model. In reality, this model is rarely used because it is to be expected that variability in the nature of the relationship (slopes) would normally create variability in the overall level of the outcome variable (intercepts).

Fig. 13.8 Random intercept and slope



13.2.2.3 Random Intercept and Slope Model

Within this model both the intercepts and the slopes can vary across organisations. Both the initial differences in the overall level of the outcome variable and differences in the nature and strength of the relationship across organisations are being considered. Figure 13.8 represents this model.

13.2.3 Which Conditions Should Be Fulfilled?

13.2.3.1 Assumptions

Because HLM is an extension of regression analysis all assumptions of regression analysis apply to HLM. There is however one exception, in some cases the violation of independence can be resolved if this independence is caused by a level-2 variable, that is a variable at the level of the organisation. However, not all absence of independence can be explained by variables on the organisational level.

In addition, two supplementary assumptions are made that pertain to the random coefficients. In a random intercept model, it is assumed that the intercepts across the different organisations follow a normal distribution. In a random slopes model, this assumption also applies to the regression coefficients (Field 2009).

13.2.3.2 Sample Size

The complexity of HLM makes it difficult to formulate rules of thumb concerning the required sample size that can be applied to all datasets (Cools et al. 2008). However, some general guidelines can be offered together with the advice to execute

power analysis with the help of statistical software packages. In general, introducing another level in the analysis means that more parameters need to be estimated, and the more parameters that need to be estimated the larger the sample needs to be. It has been suggested that the number of groups are more important than the number of individuals in that group (de Leeuw and Kreft 1998). When interested in cross-level interactions the general guideline is that more than 20 groups/contexts (i.e., organisations) are needed and that each group size should not be “too small” (Field 2009). A more general but debateable rule of thumb is the 30/30 rule, meaning that at least 30 groups with 30 individuals are needed. However, as mentioned before the more complex the model, the larger the sample size needs to be and vice versa. For example, a simple HLM analysis (e.g., level-1 relationships with a random intercept) can be run with a dataset that is comparable to what would be needed to run a regression analysis.

The sample size of the collected data will also be important for the choice of the estimation method of the parameters, these estimation methods are discussed within the following section ‘analysing and interpreting the data’.

13.3 Analysing and Interpreting the Data

Within this section the goal is to offer some guidelines for making decisions about the data and the steps that could be followed within the analyses, as well as the interpretation of the results. However, bear in mind that how the model is build and the decisions taken within this process need be theory driven. The procedure can differ depending on the subject and data at hand.

13.3.1 *Illustration: Concept and Sample*

Throughout this section the use of HLM will be illustrated with a dataset that was compiled to investigate the learning intentions of employees. The theory of reasoned action of Fishbein and Ajzen (1975) serves as the theoretical framework for defining a learning intention. Within this theory an individual’s intention plays a central role in the decision making process of the individual (Baert et al. 2006). A learning intention can be defined as a readiness or even plan to undertake a concrete action in order to neutralise the experienced discrepancy, and to reach a desired situation by means of training and education (Kyndt et al. 2011). Within this investigation the role of self-efficacy, employability, self-directedness in career processes, time management, pay satisfaction, and perceived organisational support was investigated. These variables can all be situated at the level of the individual. The sector of the organisation (public versus private) was included as a level-2 predictor. A more complete theoretical background on learning intention and its predictors included in the dataset can be found in Kyndt et al. (Accepted).

Table 13.1 Educational level participants

Educational level	Frequency	Percentage	Cumulative percentage
No degree	48	3.9	3.9
Elementary school	28	2.3	6.2
Lower secondary education	124	10.2	16.4
Special needs education	28	2.3	18.7
Vocational secondary education	144	11.8	30.5
Higher secondary education	440	36.2	66.7
Professional bachelor	194	15.9	82.6
Master	193	15.9	98.5
Other	18	1.5	100
Missing	26		

The sample consisted of 1,243 employees (55 % female). The majority of these participants (82.3 %) were employed within 21 different organisations; the remaining 29.3 % of the participants did not provide the name of their organisation. Almost half of the participants (48.42 %) was employed within the public sector, the other 51.58 % was active in the private sector. The majority of the employees had a fulltime tenured position (61.8 %), 13.28 % had a part-time tenured contract, 10.66 % were temporarily employed and the remaining 14.26 % indicated having an ‘other’ type of contract (e.g., independent, constitutional appointment, etc.). On average, employees were 41.88 years old ($SD=11.91$) and had 13.54 years of seniority ($SD=12.85$). Table 13.1 contains the information regarding the educational level of the participants.

For this illustration the analyses were performed with the *lmne* package of R. R is free software for statistical computing that can be downloaded from www.R-project.org (R Development Core Team 2012). The R code of this example can be found in Appendix. HLM analysis can also be performed with SPSS, SAS MIXED procedure, HLM 7.0 or MLwiN. Each package has its advantages and disadvantages, see Tabachnick and Fidell (2001) or Twisk (2006) for a comparison of software for HLM analysis.

For this illustration, we chose to present the outputs as given by R so that the readers would recognise these outputs when undertaken the analysis themselves. These outputs present more information than discussed in this introductory chapter therefore we have marked the values on which the interpretations are based. We will explain step by step how the final model was built. When performing the analysis in R, the first steps that need to be undertaken are setting a working directory, loading the data, and installing the necessary packages. All information regarding the structure of that data, reliability of the scales, descriptive statistics and correlations can be found in Kyndt et al. (Accepted). For the clarity of the illustration the demographic characteristics of the participants will not be included in the multilevel model. Therefore results in terms of the research topic should be interpreted with caution. Readers interested in this research topic are referred to the article (Kyndt et al. Accepted).

The following steps in the analysis process will be explained and illustrated:

- Choosing an estimation method
- Assessing model fit and comparing different models

- Checking the need for HLM
- Centring the data
- Random intercept model with fixed predictors
- Random intercept and slope model
- Calculating effect sizes
- Reporting the results

13.3.2 Choosing an Estimation Method

A first step in the analysis involves choosing an estimation method for the parameters. In general two different estimation methods are used: Full Information Maximum Likelihood (FIML) and Restricted Maximum Likelihood (REML).

Both methods have their advantages and disadvantages, as already mentioned the sample size is one of the things that plays a role when deciding which estimation method to use. When the sample size is rather small, for example when only the minimum requirements discussed in the section ‘sample size’ are met, REML is more suited because FIML can lead to a negative bias in the estimates, especially when the number of parameters increases (i.e., additional predictors and random slopes). However, FIML has a large advantage when building the model. Later on it will be explained how different multilevel models can be compared in terms of how well they fit the data. When using FIML, it is possible to compare the fit of both the regression coefficients and variance estimates, whereas REML only allows comparing variance estimates (Peugh 2010). In other words, when comparing multilevel models REML only allows a researcher to conclude which model explains the most variance in the data. When comparing multilevel models estimated using FIML, it is also possible to draw conclusions about the comparison of regression coefficients, for example it can be determined whether a random intercept shows a better fit than a fixed intercept. For a more in depth discussion of these methods, the reader is referred to the work of Peugh (2010), Goldstein (2003) and Raudenbush and Bryk (2002).

Because the sample size in our illustration is sufficiently large ($n = 1,243$) and the interest lies in comparing the coefficients of different HML models, the FIML estimation method will be used for this example.

13.3.3 Assessing Model Fit and Comparing Different Models

Comparing different models is an essential part of HLM analysis, based on the comparisons of these models the (final) model is built up in search of the best model possible given the data. The overall fit of a multilevel model is tested by means of the Chi-square likelihood ratio test. To calculate this Chi-square likelihood ratio test, the $-2\log$ -likelihood statistic can be used. When comparing different nested models, that is models that built further on each other like in our example, a smaller

$-2\log$ -likelihood is better; however this value cannot be interpreted as such because there are no cut-off values that indicate a good or bad fit. It can only be concluded that in comparison with another model, a certain model has a better or worse fit with the data (Field et al. 2012). A significant Chi-square statistic indicates that the model with the lowest $-2\log$ -likelihood has a significantly better fit than the model to which it has been compared. Typically a new model that includes all the parameters of the old model complemented with new parameters is compared to the old model. Each new parameter that is included in the model will lead to a decrease in the $-2\log$ likelihood, however the goal is to reach an as good as possible model fit with an as simple as possible model. Therefore the statistical significance of this difference is tested.

13.3.4 Checking the Need for HLM

Two different dominant views are present within the literature on HLM concerning the fact whether or not one should check if there is a need for HLM. On the one hand there is the view that this should not be checked, because HLM should always be applied when the data are nested (e.g., Goldstein 2003; Raudenbush and Bryk 2002). On the other hand, researchers have argued that nested datasets do not automatically require HLM (Peugh 2010). In the latter view, if there is no variation in response variables across organisations (level-2 units), there is no need for HLM and regression analysis can be used to analyse the data. In favour of the first view it can be said that it is not wrong to use HLM for nested datasets even if the variation across organisations is limited or non-existing. The results of HLM will resemble those of the regression analysis, but will from a conceptual point of view reflect the model in a more appropriate way.

However, from a pragmatic point of view, it can be argued that it is easier for researchers and readers with a limited amount of statistical knowledge to conduct and interpret regression analysis in comparison with HLM. Therefore also the second view has its merits. These researchers check the need for HLM by calculating the intraclass correlation (ICC) and the design effect statistics (Peugh 2010) based on the variance components of a random intercept model that does not include predictors (null model). The ICC reflects the proportion of variance of the dependent variable that can be explained by the mean scores of that same dependent variable across the organisations. A large ICC indicates that a large proportion of the variation in the dependent variable occurs at the level of the organisation and that the assumption of independence of regression analysis is violated. When the ICC is large, this means that differences are occurring at the level of the organisation rather than at the level of the individual. For example, when investigating the difference in participation in work-related learning amongst employees, a large ICC would indicate that differences in participation could be attributed to the differences at the organisational level (e.g., training budget) rather than differences at the individual level (e.g., age).

Calculating the ICC

Step 1: Calculate the null model.

Step 2: ICC = variance intercept / (variance intercept + variance residual)

The design effect is calculated based on the ICC score and the average number of employees within the organisation. Note that this average number of employees pertains to the average number of participants in the dataset that are nested in each organisation and not the size of the firm in terms of number of employees, which is often used as a predictor when investigating participation in work-related learning for example (Kyndt and Baert 2013). This design effect quantifies the effect of the violation of independence on standard error estimates; it quantifies the negative bias that results from nested data (Peugh 2010). According to Peugh (2010) a non-zero ICC combined with a design effect higher than 2, indicates the need for HLM (Muthén 1994; Peugh 2010).

Calculating the design effect

$$\text{Design effect} = 1 + (n_c - 1) \times \text{ICC}$$

n_c = average number of participants per organisation

Next, we will illustrate this approach with the data from our example. Output 13.1a shows the results of the random intercept null model predicting learning intention, subsequently it was calculated that the ICC equals .17 and design effect equals 9.03 (Output 13.1b). These values indicate the need for HLM because the ICC is larger than zero and the design effect is larger than 2 (Peugh 2010).

Random Intercept Model

```

Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2661.007 2675.769 -1327.504

Random effects:
Formula: ~1 | OrganisationID
(Intercept), Residual
StdDev: 0.4040179 0.8802076

Fixed effects: Intention ~ 1
              Value Std.Error DF t-value p-value
(Intercept) 3.069527 0.1008507 992 30.43634      0

Standardized Within-Group Residuals:
      Min       Q1       Med       Q3       Max
-2.88547944 -0.70480876 0.07414122 0.65850597 2.42413551

Number of Observations: 1013
Number of Groups: 21
    
```

Output 13.1a Random intercept model

```

Calculation variance:
Variance = SD2
Variance intercept = .40401792 = .16323046
Variance residual = .88020762 = .77476542

Calculation ICC:
ICC = variance intercept / (variance intercept + variance residual)
ICC = .16323046 / (.16323046 + .77476542) = .17402044

Calculation average number employees per organisation:
Nc = 1013/21 = 48.24

Calculation Design effect:
Design effect = 1 + (nc - 1) x ICC
Design effect = 1 + (48.24-1) x .17
Design effect = 9.0308

```

Output 13.1b Calculation of ICC and design effect

Alternatively when using FIML, the need for HLM can also be checked by calculating a null model with a fixed intercept (using maximum likelihood estimation) and a null model including a random intercept and subsequently test with the Chi-square likelihood ratio test which model fits the data best. However, only the fit of two models that are identical with the exception that in the first model the intercept is fixed and in the second model the intercept is random, can be compared. If the Chi-square likelihood ratio test is significant and the random intercept model has the smallest $-2\log$ -likelihood value, a HLM analysis should be applied to the data.

It is important to notice that for this comparison the same number of subjects should be included in both analyses. When a complete dataset is available this will not be a problem. However, when confronted with missing values a listwise deletion of missing values is the easiest way to achieve this equality. Output 13.2 shows the results of both models and their comparison. The Chi-square likelihood ratio test is significant and the $-2\log$ likelihood of the random intercept model is smaller than the $-2\log$ likelihood of the model with a fixed intercept. These results confirm the need for HLM. In other words, a sufficiently large proportion of the variance of employees' learning intentions can be situated at the level of the organisation. For the purpose of this book chapter both methods were illustrated, of course it is sufficient to execute one of these methods.

13.3.5 Centring the Data

In HLM analysis it is often useful to centre the predictor variables, in fact very few situations are suitable for not centring these variables (Peugh 2010). Centring involves rescaling the predictor variable by subtracting a mean score of the predictor from each individual score. This is done so that a value of zero can be interpreted meaningfully as the central tendency of the distribution (Field 2009; Peugh 2010). This is recommended for predictor variables within professional learning because a

```

Model 1: Fixed intercept model (disregarding the nested structure of the data)
Generalized least squares fit by maximum likelihood
Model: Intention ~ 1
Data: DataMultilevel
      AIC      BIC    logLik
2763.264 2773.105 -1379.632

Coefficients:
      Value Std.Error t-value p-value
(Intercept) 3.190918 0.02969272 107.4647 0

Standardized residuals:
      Min      Q1      Med      Q3      Max
-2.531188515 -0.625586063 0.009614754 0.856549177 1.915217206

Residual standard error: 0.9445832
Degrees of freedom: 1013 total; 1012 residual

Model 2: Random Intercept Model
Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2661.007 2675.769 -1327.504

Random effects:
Formula: ~1 | OrganisationID
(Intercept) Residual
StdDev: 0.4040179 0.8802076

Fixed effects: Intention ~ 1
      Value Std.Error DF t-value p-value
(Intercept) 3.069527 0.1008507 992 30.43634 0

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-2.88547944 -0.70480876 0.07414122 0.65850597 2.42413551

Number of Observations: 1013
Number of Groups: 21

Comparison fixed and random intercept model:
InterceptOnly: -2log Lik. = 2759.264 (df=2)
randomInterceptOnly: -2log Lik. = 2655.007 (df=3)

Model      df      AIC      BIC    logLik  Test  L.Ratio  p-value
interceptOnly  1 2 2763.264 2773.105 -1379.632
randomInterceptOnly  2 3 2661.007 2675.769 -1327.504 1 vs 2 104.2569 <.0001
    
```

Output 13.2 Fixed intercept and random intercept model

score of zero usually has no intrinsic substantive meaning or because a score of zero is not within the range of scores for which interesting conclusions can be derived (e.g., Likert scales from 1 to 5). For example, if one would be interested in the relationship between an individual’s IQ and his monthly wage, centring would be recommended because an IQ of zero and wage of zero do not occur, therefore interpreting an intercept of zero is meaningless within the relation between IQ and monthly wage. In addition, centring can partly resolve multicollinearity between predictor variables and centred multilevel models are more stable (Field 2009).

Two forms of centring are common for HLM analysis: grand mean centring and group mean centring. *Grand mean centring* involves subtracting the sample mean

(the mean score of all individuals included in the sample) from the predictor score of each individual. With *group mean centring* the mean of the individuals in the group (or organisation) is subtracted from the predictor score of each individual in that group. In this case, the mean is calculated for each organisation separately and then subtracted from the predictor score belonging to the employee of that organisation. Grand mean centring does not change the model, meaning that is comparable across groups. Because group mean centring involves subtracting a (possibly) different mean for each group it is logical that the models cannot be compared as such across the different organisations. Therefore Peugh (2010) advises to use group mean centring when only level-1 predictors are included in the analysis, because when only investigating level-1 relationships it is only necessary to merely control for the nested structure of the data and group mean centring is appropriate. When interested in differences between organisations, it is necessary to be able to compare the model across the different organisations. Therefore when level-2 predictors (i.e., organisational characteristics) are included in the analysis Peugh (2010) recommends grand mean centring. Enders and Tofghi (2007) make four recommendations that are partially in line with Peugh's (2010) recommendations. Their recommendations start from the research questions of the empirical study at hand. They advice group mean centring if the primary interest focuses on the association between level-1 predictors (a). For example, group mean centring is appropriate when investigating the relation between an employee's motivation and his approach to learning at work. In this case one can say that it is merely controlled for the fact that individuals are nested within organisations. When the primary interest is on the level-2 predictors while controlling for level-1 predictors, Enders and Tofghi (2007) advice grand mean centring (b). A possible research question could for example focus on the relationship between the industries and employees' participation in formal learning activities. In their view, and in contrast to Peugh (2010) both types of centring are possible when looking at the differential influence of a variable at level-1 and level-2 (c). In other words, when investigating the relationship between both individual and organisational characteristics on individual outcomes, such as the influence of learning attitude and sector on employees' job satisfaction. Finally, group mean centring is preferable for examining cross-level interactions (Enders and Tofghi 2007), such as the interaction between employees' educational level and a firm's training policy (d).

The choice between group mean and grand mean centring only applies to level-1 predictors. Group mean centring cannot be applied to level-2 predictors because it is an inherent characteristic of these predictors to be equal for all individuals within the same organisation (Enders and Tofghi 2007). For level-2 predictors, a researcher can choose between the raw score or grand mean centring (Enders and Tofghi 2007). Because only predictors are centred, there is no need to centre the data before the need for HLM is determined because the need for HLM is determined based on the model that only includes the intercept.

The study that is used as an illustration in this chapter includes both level-1 and level-2 predictors, in line with the guidelines of Peugh (2010) the predictors self-efficacy, time management, perceived organisational support, self-directedness in

career processes, pay satisfaction and employability will be centred by means of the grand mean centring method. The sample mean of each variable is subtracted from the score of each subject.

13.3.6 Random Intercept Model with Fixed Predictors

HLM analyses involve several steps in which a model is built up. When the need for HLM is established, the analyses are continued starting from the empty random intercept model. In a first step fixed predictor variables are added to the null model. Like in ordinary least-squares regression analysis this can be done stepwise or full subsets of predictors can be used. The analysis can either be started by adding the variables that are hypothesized to make the most important contribution to the model, followed by the second most important variable, etc. Each time it should be tested if this results into a better model than before. In this example, the predictor self-directedness in career processes was added to the model. Output 13.3 presents these results. The model including self-directedness shows a better fit than the model containing no predictors. In addition self-directedness is a significant predictor of an employees' learning intention when initial organisational differences in terms of the intercept are taken into account.

```

Model 3: Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2337.415 2357.097 -1164.707

Random effects:
Formula: ~1 | OrganisationID
      (Intercept) Residual
StdDev:   0.2742968 0.7521469

Fixed effects: Intention ~ Cdirectedness
              Value Std.Error DF  t-value p-value
(Intercept)  3.0805839 0.07195713 991 42.81138      0
Cdirectedness 0.7329617 0.03734167 991 19.62852      0

Correlation:
      (Intr)
Cdirectedness 0.007

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.9880997 -0.6514354  0.1396961  0.6715072  2.6470453

Number of Observations: 1013
Number of Groups: 21

Comparison with random intercept model:
      Model df      AIC      BIC    logLik  Test  L.Ratio  p-value
randomInterceptOnly  1  3  2661.007  2675.769 -1327.504
randomInterceptDirect  2  4  2337.415  2357.097 -1164.707  1 vs 2  325.5924  <.0001

randomInterceptDirect:  -2log Lik. = 2329.415 (df=4)
    
```

Output 13.3 Random intercept model with self-directedness as a fixed predictor

```

Model 4: Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2265.702 2309.988 -1123.851

Random effects:
Formula: ~1 | OrganisationID
      (Intercept) Residual
StdDev:  0.2598758 0.7225583

Fixed effects: Intention ~ Cdirectedness + Ctime + Cefficacy + Cemployability +
Csupport + Cfinancial
              Value Std.Error DF t-value p-value
(Intercept)  3.0837485 0.06871690 986 44.87613 0.0000
Cdirectedness 0.5717715 0.04412589 986 12.95773 0.0000
Ctime         0.1426350 0.02709274 986 5.26470 0.0000
Cefficacy     -0.0268543 0.05188570 986 -0.51757 0.6049
Cemployability 0.1299607 0.03602337 986 3.60768 0.0003
Csupport      0.1608344 0.03882145 986 4.14293 0.0000
Cfinancial    -0.0060371 0.02908900 986 -0.20754 0.8356

Correlation:
      (Intr) Cdrctd Ctime Cffccy Cmplyb Cspprt
Cdirectedness 0.023
Ctime         0.220 -0.225
Cefficacy     -0.051 -0.387 -0.088
Cemployability 0.013 -0.081 -0.011 -0.344
Csupport      0.007 -0.156 -0.164 0.005 -0.137
Cfinancial    -0.031 0.099 -0.010 -0.090 0.014 -0.451

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.34828578 -0.67519565 0.09474177 0.69929517 2.75349733

Number of Observations: 1013
Number of Groups: 21

Comparison with random intercept model with one predictor
      Model df      AIC      BIC    logLik  Test L.Ratio p-value
randomInterceptDirect  1  4 2337.415 2357.097 -1164.707
randomInterceptFull    2  9 2265.702 2309.988 -1123.851 1 vs 2 81.71326 <.0001

randomInterceptFull: -2log Lik. = 2247.702 (df=9)
    
```

Output 13.4 Random intercept model including all level-1 predictors (fixed effects)

Besides this stepwise forward method, a full subset method can be chosen. In this example all our predictors were inserted at the same time into the model. Output 13.4 shows the results of the model containing all level-1 predictor variables included in this research study. Self-directedness in career processes, time management, pay satisfaction, employability, perceived organisational support, and self-efficacy are simultaneously included in the model to predict an employees’ learning intention. The results show that directedness, time management, employability and perceived organisational support are significant positive predictors of an employees’ learning intention. Self-efficacy and pay satisfaction are not significant.

Now it can be decided to continue with this ‘full’ model that comprises all the level-1 predictor variables or to remove the non-significant predictors. In this case, it can be tested whether a model only containing the significant predictors still yields a better fit in comparison with the previous model that showed an improved model fit. For our example this means that self-efficacy and pay satisfaction will be removed from the model. Output 13.5 shows that the model without these


```

Model 5: Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2262.036 2296.481 -1124.018

Random effects:
Formula: ~1 | OrganisationID
(Intercept) Residual
StdDev:    0.2607045 0.7226461

Fixed effects: Intention ~ Cdirectedness + Ctime + Cemployability + Csupport
              Value Std.Error DF t-value p-value
(Intercept)  3.0812752 0.06868172 988 44.86310 0e+00
Cdirectedness 0.5636445 0.04055550 988 13.89810 0e+00
Ctime         0.1412574 0.02695992 988  5.23953 0e+00
Cemployability 0.1233618 0.03378571 988  3.65130 3e-04
Csupport      0.1564820 0.03459019 988  4.52389 0e+00

Correlation:
      (Intr) Cdrctd Ctime  Cmplyb
Cdirectedness  0.006
Ctime          0.015 -0.282
Cemployability -0.005 -0.247 -0.044
Csupport       -0.010 -0.152 -0.193 -0.171

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.3777093 -0.6684023  0.1034987  0.6993091  2.7492216

Number of Observations: 1013
Number of Groups: 21

Comparing full model with model without non-significant predictors
      Model df      AIC      BIC    logLik Test  L.Ratio p-value
randomInterceptDirect  1  4  2337.415 2357.097 -1164.707
randomInterceptFull2   2  7  2262.037 2296.481 -1124.018 1 vs 2 81.37832 <.0001

randomInterceptFull2: -2log Lik. = 2248.036 (df=7)
    
```

Output 13.5 Removing non-significant predictors

non-significant predictors still has an improved model fit in comparison with the model only containing self-directedness. Because Model 5 contains fewer predictors than Model 4, the $-2\log$ likelihood is slightly higher. However Model 5 is a simpler model than Model 4 and shows a fit that is not significantly better or worse than the model including the non-significant predictors. Especially, when the dataset is limited and additional parameters need to be included, we would give the advice to remove non-significant predictors in order to avoid an over-parameterisation of the model, which may lead to convergence problems.

13.3.7 Random Intercept and Slope Model

When it has been determined that the intercept is random, researchers usually built further on this model because the variability in the slopes would normally create variability in the overall level of the outcome variable (intercepts).

When it is expected that the relationship between the predictor variable and the outcome variable may vary between different organisations, a random slopes model can be tested. To determine whether the variance in the slope is significant, two models including the same parameters for which the only difference is that the parameters are fixed instead or random can be compared. After testing the random intercept and regression coefficients, level-2 variables that could explain the variation in the slopes and intercept can be introduced.

It is important that it makes sense from a conceptual point of view that the predictor variable of which the slope is set to random can actually vary between organisations. In other words it should be possible to hypothesize from the theoretical background that the relationship between a predictor variable and outcome variable can potentially vary between different organisations. In this example, it is hypothesized that the relationship between perceived organisational support and an employees' learning intention could vary across organisations. Output 13.6 indeed shows that including a random slope for the organisational support improves the model fit. Within this

```

Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC      logLik
2259.797 2304.083 -1120.899

Random effects:
Formula: ~Csupport | OrganisationID
Structure: General positive-definite, Log-Cholesky parametrization
              StdDev      Corr
(Intercept) 0.24815049 (Intr)
Csupport    0.08474624 0.838
Residual    0.71999459

Fixed effects: Intention ~ Cdirectedness + Ctime + Cemployability + Csupport
              Value Std.Error DF t-value p-value
(Intercept) 3.0810959 0.06615086 988 46.57681 0e+00
Cdirectedness 0.5746528 0.04046762 988 14.20031 0e+00
Ctime         0.1418792 0.02686214 988 5.28175 0e+00
Cemployability 0.1245083 0.03363032 988 3.70226 2e-04
Csupport      0.1408532 0.04126539 988 3.41335 7e-04
Correlation:
              (Intr) Cdrctd Ctime Cmplyb
Cdirectedness 0.004
Ctime         0.014 -0.288
Cemployability -0.003 -0.249 -0.041
Csupport      0.389 -0.141 -0.159 -0.130

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.16300632 -0.69456599 0.09055579 0.70308260 2.73027846
Number of Observations: 1013
Number of Groups: 21

Comparing random intercept model with fixed effect to the random slope model
      Model df      AIC      BIC      logLik      Test L.Ratio p-value
randomInterceptFull12 1 7 2262.037 2296.481 -1124.018
addRandomSlope        2 9 2259.797 2304.083 -1120.899 1 vs 2 6.239108 0.0442

addRandomSlope: -2log Lik. = 2241.80 (df=9)

```

Output 13.6 Random intercept and random slope model

random intercept and random slope model, perceived organisational support is a significant random predictor for an employee’s learning intention. Self-directedness, employability and time management remain significant fixed predictors of an employee’s learning intention. The relationship of these three latter variables to an employee’s learning intention is assumed to be equal within every organisation, whereas the relationship between organisational support and learning intention varies between organisations. Based on this model however, the variance between organisations based on organisational characteristics or level-2 predictors cannot be explained. It can only be concluded that this relationship varies.

After testing if a random slope model yields a better fit, level-2 predictors can be added to the model. In our example, the only level-2 predictor that was included was the sector (public versus private) of the organisations. First sector is added as a fixed predictor. Output 13.7 demonstrates that including sector in the model resulted into a better fit. The public sector was given the code ‘0’, while the private sector was

```

Model 7: Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC    logLik
2255.958 2305.165 -1117.979

Random effects:
Formula: ~Csupport | OrganisationID
Structure: General positive-definite, Log-Cholesky parametrization
              StdDev      Corr
(Intercept) 0.22400908 (Intr)
Csupport    0.08862837 0.995
Residual    0.71938149

Fixed effects: Intention ~ Cdirectedness + Ctime + Cemployability + Csupport +
Sector
              Value Std.Error DF t-value p-value
(Intercept)  3.242574 0.08450946 988 38.36936 0.0000
Cdirectedness 0.580665 0.04026664 988 14.42049 0.0000
Ctime         0.142282 0.02679924 988  5.30917 0.0000
Cemployability 0.122211 0.03344320 988  3.65430 0.0003
Csupport      0.142633 0.04078178 988  3.49747 0.0005
Sector       -0.277918 0.10418827  19 -2.66746 0.0152

Correlation:
              (Intr) Cdrctd Ctime  Cmplyb Cspprt
Cdirectedness 0.010
Ctime         0.007 -0.293
Cemployability -0.017 -0.248 -0.038
Csupport      0.458 -0.130 -0.162 -0.142
Sector       -0.690 -0.014  0.006  0.023 -0.137

Standardized Within-Group Residuals:
              Min      Q1      Med      Q3      Max
-3.06400439 -0.68286129 0.09259604 0.69382784 2.73321922
Number of Observations: 1013
Number of Groups: 21

Comparing random slope model to random slope model with level-2 predictor
              Model df      AIC      BIC    logLik  Test L.Ratio p-value
addRandomSlope  1  9 2259.797 2304.083 -1120.899
addRandomLevel2  2 10 2255.958 2305.164 -1117.979 1 vs 2 5.83954 0.0157
addRandomLevel2: -2log Lik. = 2235.96 (df=10)
    
```

Output 13.7 Random slope model with level-2 predictor

coded '1'. The results show that employees in the public sector have higher learning intentions than those in the private sector.

Subsequently, a cross-level interaction effect between sector and organisational support is added to explore whether sector is able to explain the variation in the slope of organisational support. Output 13.8 shows that this cross-level interaction does not improve the model fit. Because the random slopes model including sector as a level-2 predictor (Model 7) was the last model that increased the model fit, this model is considered as the final model on which the conclusions are based.

```

Model 8: Linear mixed-effects model fit by maximum likelihood
Data: DataMultilevel
      AIC      BIC      logLik
2257.811 2311.939 -1117.906

Random effects:
Formula: ~Csupport | OrganisationID
Structure: General positive-definite, Log-Cholesky parametrization
StdDev      Corr
(Intercept) 0.22232708 (Intr)
Csupport     0.08822628 0.996
Residual     0.71940551

Fixed effects: Intention ~ Cdirectedness + Ctime + Cemployability + Csupport +
Sector + Csupport:Sector
      Value Std.Error DF t-value p-value
(Intercept) 3.225260 0.09588197 987 33.63782 0.0000
Cdirectedness 0.580085 0.04032672 987 14.38463 0.0000
Ctime 0.142413 0.02681203 987 5.31153 0.0000
Cemployability 0.122434 0.03346191 987 3.65891 0.0003
Csupport 0.126164 0.05946629 987 2.12161 0.0341
Sector -0.251678 0.12464290 19 -2.01919 0.0578
Csupport:Sector 0.029388 0.07780262 987 0.37772 0.7057

Correlation:
      (Intr) Cdrctd Ctime Cmplyb Cspprt Sector
Cdirectedness 0.031
Ctime 0.002 -0.293
Cemployability -0.024 -0.249 -0.038
Csupport 0.625 -0.055 -0.117 -0.111
Sector -0.770 -0.038 0.010 0.029 -0.482
Csupport:Sector -0.480 -0.047 0.008 0.019 -0.728 0.554

Standardized Within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.03787659 -0.69952968 0.09729221 0.68859241 2.72806969
Number of Observations: 1013
Number of Groups: 21

Comparing random slope model to random slope model with level-2 predictor
      Model df      AIC      BIC      logLik      Test      L.Ratio p-value
addRandomLevel2 1 10 2255.958 2305.164 -1117.979
CrossLevel: 2 11 2257.811 2311.939 -1117.906 1 vs 2 0.1466011 0.7018
CrossLevel: -2log Lik. = 2235.81 (df=11)
    
```

Output 13.8 Cross-level interaction

13.3.8 Calculating Effect Sizes

The calculation of effect sizes in HLM analysis is a debated topic and currently no consensus exists with regard to which effect sizes are the most appropriate. In addition, it can be noticed that these effect sizes are actually very rarely reported in published articles. Probably due to the lack of consensus and the difficulty in calculating these effect sizes. However, within the framework of this chapter, it is important to provide the reader with a basic knowledge of effect sizes in HLM.

Below the basic effect sizes that are generally accepted will be presented (Raudenbush and Bryk 2002). Overall two types of effect sizes are distinguished: effect sizes that represent the variance in the outcome variable that is explained by all predictors, and the effect sizes that represent the effect of a specific variable on the outcome variable. When interested in the variance that is explained by all predictor variables, the predicted score for each individual in the dataset can be calculated. In most software programs the option to save these predicted values can be chosen when calculating the final model. Subsequently, the correlation coefficient between the predicted and observed scores of the outcome variable needs to be calculated and squared. This squared correlation coefficient is known as the pseudo- R^2 (Peugh 2010; Raudenbush and Bryk 2002).

Calculating the effect size of each variable separately is more complicated in comparison with the pseudo- R^2 . This effect size is called the proportional reduction in variance (i.e., reduction in residual variance). However, to calculate this effect size for each variable separately, each variable would have to be added separately to the model because this effect size simply informs the researcher about how large the proportion of residual variance reduction is in comparison with the prior model that did not include the predictor for which the effect size is being determined (Peugh 2010; Roberts and Monaco 2006). The proportional reduction in variance (PRV) can be calculated as follows:

$$PRV = \left(var_{\text{prior model}} - var_{\text{model with predictor}} \right) / var_{\text{prior model}} \cdot$$

var = residual variance model

However, some caution is needed when interpreting this effect size because the results can be counterintuitive. For example, this *PRV* can be larger than the overall pseudo- R^2 , however these two effect sizes are not comparable and should not be interpreted in relation to each other (Peugh 2010). In addition, it is possible to obtain negative values for *PRV* when for instance level-2 predictors are included in the model (Roberts and Monaco 2006). Roberts and Monaco (2006) present of an overview of adjustments to the calculation of this effect size proposed in order to solve this problem.

Besides calculating the above-described effect sizes there are other ways to determine which variables contribute the most or the least to the model. By standardizing the variables included in the research, standardized coefficients are

calculated that can be compared. In addition the ICC discussed above, can be interpreted as an effect size of the random effects (Roberts and Monaco 2006). Readers who wish to know more about the effect sizes in HLM are referred to Hedges (2007, 2011).

13.3.9 Reporting the Results

Multilevel models can take on many different forms, making it difficult to offer one template that can be applied to all types. As was illustrated throughout this chapter, performing HLM analyses includes multiple steps in which a model is built up. It is advisable to report on all of these stages (Field 2009) as well as the software used to calculate the model. In addition, it is important to report the estimation method and the type of centring that were adopted.

For each model the F -statistics or t -statistics, degrees of freedom, and p -values should be reported. In addition, the variance components (random effects) and $-2\log$ likelihood should be presented. The output in R presents the standard deviations of the random coefficients, these need to be squared in order to obtain the variance components. For the model comparison statements need to be underpinned by reporting the Chi-square statistic, degrees of freedom, and p -value. This information can be presented in a table (see for example Table 13.2).

For our example, the results could be presented as follows:

The final multilevel model calculated to test our hypotheses was built up in several steps. Table 13.2 presents the results of the multilevel analyses and model comparisons. The first step involved testing a model without predictors that included a fixed intercept (Model 1). Secondly, a model without predictors including a random intercept was calculated (Model 2) and compared to Model 1 using the chi-square likelihood ratio test. Model 2 showed a better fit than Model 1. The analysis was continued by adding self-directedness as a fixed predictor (Model 3). Subsequently, all other predictor variables were added to the model (Model 4). Because self-efficacy ($t = -.52$, $df = 986$, $p = .60$) and pay satisfaction ($t = -.21$, $df = 986$, $p = .84$) were non-significant predictors, the variables were removed from the model (Model 5). After adding all level-1 fixed effects, a random slope model was tested, more specifically a random slope for organisational support was added (Model 6). In a next step the level-2 variable sector was included (Model 7). Finally, a cross-level interaction effect between organisational support and sector was added (Model 8). This did not improve the model fit. Therefore Model 7 was chosen as the final model.

The results of the final model (pseudo- $R^2 = 42.80\%$) show that self-directedness, time management, and employability are significant positive fixed predictors of an employee's learning intention when initial overall differences in learning intention between organisations are taken into account. In addition, results show that employees in the public sector have a higher learning intention than employees in the private sector. Self-directedness is the strongest fixed predictor of all the

Table 13.2 Results multilevel analyses

Model	1	2	3	4	5	6	7	8
<i>Fixed effects – t-statistic (df)</i>								
(Intercept)	107.47*** (992)	30.44*** (992)	42.81*** (991)	44.88*** (986)	44.86*** (988)	46.58*** (988)	38.37*** (988)	33.64*** (987)
Self-directedness			19.63*** (991)	12.96*** (986)	13.90*** (988)	14.20*** (988)	14.42*** (988)	14.38*** (987)
Time management				5.26*** (986)	5.24*** (988)	5.28*** (988)	5.31*** (988)	5.31*** (987)
Employability				3.61*** (986)	3.65*** (988)	3.70*** (988)	3.65*** (988)	3.66*** (987)
Support				4.14*** (986)	4.52*** (988)	3.41*** (988)	3.50*** (988)	2.12* (987)
Self-efficacy				-.52 (986)				
Pay satisfaction				-.21 (986)				
Sector							-2.67* (19)	-2.02 (19)
Support*Sector								.38 (987)
<i>Random effects – variance components</i>								
(Intercept)		.16	.08	.07	.07	.06	.05	.05
Support						.01	.01	.01
Residual		.77	.57	.52	.52	.52	.52	.52

(continued)

Table 13.2 (continued)

Model	1	2	3	4	5	6	7	8
<i>Model comparison</i>								
-2log likelihood	2,759.26	2,655.01	2,329.42	2,247.70	2,248.04	2,241.80	2,235.96	2,235.81
Models compared		1 vs. 2	2 vs. 3	3 vs. 4	3 vs. 5	5 vs. 6	6 vs. 7	7 vs. 8
χ^2		104.26***	325.59***	81.71***	81.38***	6.24*	5.84*	.15
(df)		(2, 3)	(3, 4)	(4, 9)	(4, 7)	(7, 9)	(9, 10)	(10, 11)

Note: $N_{\text{observations}} = 1,013$, $N_{\text{groups}} = 21$; * $p < .05$, ** $p < .01$, *** $p < .001$; Model 1: fixed intercept; Model 2: random intercept; Model 3: adding self-directedness; Model 4: adding subset of fixed predictors; Model 5: Removing non-significant predictors; Model 6: adding random slope; Model 7: adding level-2 variable; Model 8: adding cross-level interaction

hypothesized predictors. Pay satisfaction and self-efficacy were non-significant predictors of an employees' learning attention. Finally, the perceived support of the organisation is a significant positive random predictor of an employee's learning intention. The cross-level interaction between organisational support and sector could however not explain this variation across organisations.

13.4 Applications of HLM in Research on Professional Learning

Throughout this chapter examples from the research field on professional learning have been offered when clarifying the conceptual explanation of HLM. In fact, as already mentioned, all research studies that collected nested data should be analysed with a HLM approach. Within this section, the research topics within the field of professional learning that have been addressed with HLM analysis by prior research will be presented.

When searching for empirical studies within the field of professional learning, a first thing that comes to the fore is that the majority of this type of studies focused on the professional development of teachers who are nested in schools. This can probably be explained by the fact that the related field of research on school effectiveness has a rich tradition of using HLM (e.g., Cools et al. 2008; Opdenakker et al. 2002). Several research studies in the field of teacher development have investigated the effect of professional learning communities (e.g., Chi-Kin Lee et al. 2011; Lakshmanan et al. 2011), the role of teachability culture on collegial trust among teachers (Van Maele and Van Houtte 2011) and the role of teacher learning opportunities for reflective practice (Camburn 2010).

Over the last decade the interest in team learning has grown substantively (see Chap. 36 by Dochy, Gijbels, Raes, and Kyndt). Up till now the majority of the studies that have investigated this topic by aggregating individual scores to the team level (e.g., Raes et al. 2012; Van den Bossche et al. 2006), however recent research demonstrates the relevance of adopting HLM analysis when investigating team learning (Liu and Fu 2011) or advises the use of HLM for future research (Akgün et al. 2007). When considering the adoption of HLM for research on team learning it is important to keep in mind that the outcome variable should be situated at the lowest level of interest.

Other research in the field of professional learning adopting HLM appears to be scarce and scattered. For example, Martin (2009) investigated the role of learning for the motivation and engagement in the workplace using HLM and Yeo and Neal (2004) explored the role of learning orientation for performance in skills acquisition. Xiao (2002) focused on the role of education in salary growth. Other studies have formulated the advice that research on learning climate (Haurer and Westerberg 2012) and transfer of learning (van den Eertwegh et al. 2013) would benefit from adopting HLM.

In sum, research within the field of professional learning adopting HLM, especially research situated outside of the traditional school context is scarce. In addition, it can be noticed that the studies that did adopt HLM are very recent.

13.5 Discussion

Within this final section, the advantages and disadvantages of HLM for research on professional learning will be discussed. The main advantage of HLM is the fact that it is the most appropriate method of analysis for nested data. If the nested structure of the data is ignored, it is more likely that statistical relations are observed in the sample that are in fact not true (Type-1 error), in addition it might be that it is concluded that a relationships holds for individuals when they are actually true for groups (ecological fallacy). HLM allows us to identify and explain the variance at different levels of the data, in other words, it is able to identify the variance at the individual and organisational level. Moreover, predictors at the level of the organisation can be included in the analyses simultaneously with predictors at the level of the individual. Something that can be very important in the research on the professional learning of employees, because an employee's learning is the result of the interplay between the organisation and the individual (Tynjälä 2008).

However, HLM also has disadvantages and limitations. First, fairly large samples are needed, especially when multiple predictors at various levels are included. With small samples, the researcher is often confronted with convergence problems. If the software (e.g., SPSS) presents results after reporting that it was unable to reach convergence, these results should not and in fact cannot be interpreted, therefore other software package (e.g., R) do not report results because it was actually not possible to calculate results. Secondly, HLM is a fairly complex analysis (due to the many possibilities) in comparison with regression analysis, for example it requires the researcher to make decisions throughout the entire process of analysis. Finally, as discussed, it is very difficult to calculate and interpret the effect sizes when conducting HLM, in addition no consensus exists and the existing body of literature rarely reports effect sizes.

This chapter has attempted to introduce the reader with HLM without using mathematical formulas. On the one hand, the aim was to inform the reader on when this method of analysis could be appropriate. On the other hand, the goal was to introduce the reader with how a two-level analysis on cross-sectional data can be executed by integrating a theoretical explanation and illustration of the analysis performed on an authentic dataset and topic within the field of professional learning. It is believed that in a field where employees are nested within organisations and trainees are nested within trainings or trainings institutions, applying HLM can have an added value. With this chapter we hope to make a contribution to the introduction and application of HLM in the field of professional learning.

Appendix: R Code Illustration Learning Intention

```
##Setting working directory and loading data
setwd("/Users/evakyndt/Publications/Book Chapter HLM")
data<-read.table("Data learning intention.csv",header=TRUE,sep=";")
dim(data)
head(data)

##Installing packages multilevel
install.packages("car");
install.packages("ggplot2");
install.packages("nlme");
install.packages("reshape")
library(car);
library(ggplot2);
library(nlme);
library(reshape)

### data without missing values for multilevel
DataMultilevel1 <-data[, c("OrganisationID","Sector","Intention", "time",
"efficacy", "directedness", "support", "employability", "financial")]
DataMultilevel <- na.exclude(DataMultilevel1)
dim(DataMultilevel)

##Assessing the need for a multilevel model
interceptOnly <-glms(Intention ~ 1, data=DataMultilevel, method= "ML")
summary(interceptOnly)

randomInterceptOnly <-lme(Intention ~1,data=DataMultilevel, random =
~1|OrganisationID, method="ML")
summary(randomInterceptOnly)

anova(interceptOnly, randomInterceptOnly)
logLik(interceptOnly)*-2
logLik(randomInterceptOnly)*-2

##Centring level-1 predictors
DataMultilevel$Ctime <- DataMultilevel$time -mean(DataMultilevel$time)
DataMultilevel$Cfinancial <-DataMultilevel$financial -
mean(DataMultilevel$financial)
DataMultilevel$Cemployability <- DataMultilevel$employability -
mean(DataMultilevel$employability)
DataMultilevel$Cefficacy <- DataMultilevel$efficacy -
mean(DataMultilevel$efficacy)
DataMultilevel$Csupport <- DataMultilevel$support -
mean(DataMultilevel$support)
DataMultilevel$Cdirectedness <- DataMultilevel$directedness -
mean(DataMultilevel$directedness)
##Adding fixed effect self-directedness
randomInterceptDirect <-lme(Intention ~ Cdirectedness, data =
DataMultilevel, random = ~1|OrganisationID, method="ML")
summary(randomInterceptDirect)
anova(randomInterceptOnly, randomInterceptDirect)
logLik(randomInterceptDirect)*-2
```

```

##Adding all predictors
randomInterceptFull1 <-lme(Intention ~ Cdirectedness + Ctime + Cefficacy +
  Cemployability + Csupport + Cfinancial, data = DataMultilevel, random =
  ~1|OrganisationID, method="ML")
summary(randomInterceptFull1)
anova(randomInterceptDirect, randomInterceptFull1)
logLik(randomInterceptFull1)*-2

##Removing non-significant predictors
randomInterceptFull2 <-lme(Intention ~ Cdirectedness + Ctime +
  Cemployability + Csupport, data = DataMultilevel, random =
  ~1|OrganisationID, method="ML")
summary(randomInterceptFull2)
anova(randomInterceptFull2, randomInterceptFull1)
logLik(randomInterceptFull2)*-2

##Introducing random slopes for support
addRandomSlope <-lme(Intention ~Cdirectedness + Ctime + Cefficacy +
  Cemployability + Csupport + Cfinancial, data = DataMultilevel, random =
  ~Csupport|OrganisationID, method="ML")
summary(addRandomSlope)
anova(randomInterceptFull1, addRandomSlope)
logLik(addRandomSlope)*-2

##Introducing level-2 predictor
addRandomLevel2 <-lme(Intention ~Cdirectedness + Ctime + Cefficacy +
  Cemployability + Csupport + Cfinancial + Sector, data = DataMultilevel,
  random = ~Csupport|OrganisationID, method="ML", control=list(maxIter=1000,
  msMaxIter=1000, niterEM=1000))
summary(addRandomLevel2)
anova(addRandomSlope, addRandomLevel2)
logLik(addRandomLevel2)*-2

##Introducing cross-level interaction
FinalModel <-lme(Intention ~Cdirectedness + Ctime + Cefficacy +
  Cemployability + Csupport + Cfinancial + Sector + Csupport:Sector, data =
  DataMultilevel, random = ~Csupport|OrganisationID, method="ML",
  control=list(maxIter=1000, msMaxIter=1000, niterEM=1000))
summary(FinalModel)
anova(addRandomLevel2, FinalModel)

```

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Chapter 14

The Anthropological Paradigm of Practice-Based Learning

Catherine Hasse

Abstract The anthropological approach to studying culture has implied observations of and participation in other people's practices however strange and exotic they may seem. These practice-based experiences are the backbone of the anthropological profession. Anthropology has for a long time been more or less consciously entangled with defining these experiences as learning experiences and subsequently defining culture as the result of learning processes. It is, however, primarily in relation to the general focus on practice that the anthropological paradigm of practice-based learning takes shape.

The article introduces the early anthropological interests in the concept of learning as tied to teaching and culture transmission in 'exotic' cultures and discuss how 'learning' from the 1970s and onwards gradually began to establish itself as a major subfield in anthropology including cross-cultural studies of schooling 'home and abroad'. The studies of practice and the studies of learning, however, for a long time went their separate ways. Since Margaret Mead learning theory in anthropology has been intertwined with concepts like enculturation or socialisation (Schwartz 1980, ix) but often without a clear cut definition relating learning to practice. Some anthropologists have called for an explicit exploration of the concept of learning in relation to ethnographic practices and knowledge making as well as a lens for studying cultural transmission (e.g. Hansen 1982; Wolcott 1982). Others have made an implicit use of the concept of learning as an explanatory term pointing to the anthropologists' journey from novice to a more experienced knower of exotic cultures (e.g. Stoller 1987; Briggs 1970). The field where anthropological learning theory has been most systematically developed is in relation to the anthropology of education, but here little has been done in terms of developing concepts of practice-based learning (see e.g. Anderson-Levitt 2012). Finally some anthropologists

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studied people's everyday life 'at home' and found new ways of understanding culture using a cognitive rather than a practice-based learning perspective. Over time the anthropological engagements with teaching and learning have turned towards an explicit interest in learning in connection with practical activity and agency (Pelissier 1991) and most recently the concept of practice-based learning has been considered a key concept for the practice of anthropology itself (Lave 2011; Jordan 2014). This expansion has been developed in close collaboration with primarily Vygotsky- or Piaget-inspired cultural psychologists on the one hand and researchers of work-place learning on the other. More or less simultaneously a new interest in workplace practices began to appear in anthropological research but it was rarely connected to an interest in learning and cognition. These work-oriented anthropologists developed a practice-based framework of understanding workplace activities, but often without an explicit interest in connecting learning to practice. With the seminal fieldwork and subsequent publications by anthropologists like Jean Lave, Brigitte Jordan, Dorothy Holland and Ed Hutchins the interest in combining learning and practice spurred a new paradigm for studying practice-based learning through participant observation. The final section take a closer look at this last development combining theoretical issues with the future perspectives of theories on practice-based learning in the field.

Keywords Anthropology • Practice-based learning • Ethnography • Fieldwork • Participant observation • Cognitive anthropology • Cultural learning • Materials and materiality • Cultural transmission

The anthropological approach to studying culture has implied observations of and participation in other people's practices however strange and exotic they may seem. No matter how distant from their own background, anthropologists have always built their analysis on learning about everyday life by observation and sometimes participation in practical activities. An analytical understanding of these practice-based activities is the backbone of the anthropological profession. This implies studying not only what people do but also learning about the cultural meanings emerging from and through human-material engagements. It moreover implies learning about the material constraints, resources and structural conditions offered by local cultures. It is primarily in relation to the general focus on practical activity and agency that an anthropological interest in practice-based learning takes shape (Pelissier 1991). Even so there is no single definition of 'practice-based learning' in an anthropological perspective accepted by all anthropologists. In Tim Ingold's discussions of learning, practice-based learning is defined as learning through doing and understanding in practice (Ingold 2011a). Apprenticeship-studies like Jean Lave's analysis of the gradual process of becoming a tailor in Liberia (e.g. 1977) have inspired researchers from many disciplines to study learning and work practices through ethnographic methods. Studies of work-based practices in Western societies have been inspired by these detailed ethnographic studies and anthropological analysis of the variable relations between humans, cultures and practice based work.

Today the anthropological approach has become paradigmatic in parts of the social sciences of organization and work, where Tayloristic and quantifiable studies on the one hand and psychological tests on the other have been replaced with the ethnographic micro-perspectives (Bauer and Gruber 2007). The connection between situated and practice-based learning and culture as resources and structural arrangements offer valuable insights into what Stephen Billett has called the “didactics of practices in work settings” (2011, 136). Today the concept of practice-based learning is acknowledged as a key concept for anthropology (Lave 2011; Jordan 2014) but anthropological studies of practice-based learning at work is as yet an emerging field. This chapter is divided into five sections that explore the development of concepts of practice-based learning in anthropology. (1) The first part looks at how practice and learning are connected in the detailed anthropological monographic descriptions of how e.g. children learn to grow up as members of a particular culture. Children’s learning has been studied in relation to teaching and schooling cross-culturally. The main contribution to the development of notions of practice-based learning are, however, found in the detailed descriptions of children learning outside of formal schooling systems. This kind of studies has, in combination with cultural-psychological studies, challenged Western conceptions of school-based learning (e.g. Rogoff and Lave 1984). (2) The next section take a closer look at how anthropology has contributed to general learning theory and in particular learning theory with practice-based elements. These theories are both very general and abstract systemic or cognitive approaches to learning. They are dispersed and only to some extent connected with theories of practice-based learning in work. (3) The particular connection between work and practice-based learning is discussed in the next section which deals with the ethnographic studies of adult practice-based learning in relation to work. Also these studies cover a wide range of approaches. Again we find a particular interest in taking turns with the cognitive sciences. (4) The next section deals with methods and methodology. Anthropological studies of practice-based activities of work rest on two premises: ethnographic method and the holistic anthropological analytical approach. Ethnography is usually referring to the fieldwork method used by anthropologists, which implies presence and sometimes participation in cultural activities. Anthropological analysis implies a holistic approach. In anthropology ‘holism’ refer to a theoretical and methodological approach that tries to avoid a particular view on what is being studied and remains open for new and unexpected connections (see Otto and Bubandt 2010 for a thorough discussion). The distinction between ‘ethnography’ (as a data collection method employed by many different disciplines) and anthropology, which combines the ethnographic study of particular people in particular places with a theorising about the human species has been widely discussed (e.g. in Ingold 2011a and Astuti and Bloch 2012).

This section discusses how ethnographers themselves learn when they observe and sometimes even participate in cultural activities. (5) The last section discuss the influence of anthropology on studies of practice-based learning and what kind of future for workplace studies of practice-based learning this paradigmatic turn may imply.

14.1 Cross-Cultural Learning Theory

The anthropological paradigm of practice-based learning grew out of a joint cultural-psychological and anthropological effort in the 1970s to question that learning is isomorphic with institutionalized teaching and written curriculum. This critical approach is a direct extension of classical anthropological monographs. In meticulously elaborated field-reports and monographs anthropologists have reported about how children learned to become skilled cultural members without formal lessons and how young people through apprenticeships learned to master the handicrafts of importance to the local culture. In these descriptions we are for instance introduced to the practical activities of how children learn the craft of the Kpelle blacksmith in West Africa through play (Lancy 1980) and how Skolt Lapps learn circumpolar reindeer herding (Ingold 1976). It has for long been acknowledged in anthropology that even when anthropologists present their data in monographic form, cross-cultural perspectives (involving their own background as well as other anthropological monographs) always are more or less explicitly part of the study.

14.1.1 *Learning as Cultural Transmission*

Since Margaret Mead learning theory has been intertwined with concepts like enculturation or socialisation (Schwartz 1980, ix) often without a clear cut definition linking practice, learning and culture in concepts like enculturation or socialisation. In classical anthropological monographs learning is generally used synonymously with concepts like ‘socialisation’ or ‘enculturation’ or as an explanation of cultural transmission.

Many of these studies focus on how children learn the local skills of importance in particular cultural settings without the schooling dominant in Western culture (Lancy et al. 2010). As noted by Cathrine Pelissier Margaret Mead was the first anthropologist to offer a study of teaching and learning in her monograph *Coming of Age in Samoa* (Pelissier 1991, 82). She initiated a new field of interest with her study of how adolescent Samoans developed in different ways than young Americans, thus raising questions of the influence culture had on what had before been considered self-evident and biologically formed ways of reaching adulthood (Mead 1928). In this book Mead took up a criticism of the American system of schooling, which was later followed up by many other anthropologists (e.g. Lave 1988; McDermott 1974). Contrary to Samoan children, who learned in a free and easy way about their society, the American schooling system did not prepare American children to the many choices in a culture full of commercials and impressions. The study of the Samoan socialization process became a cornerstone of the American culture and personality school, which underlines how culture and learning shape personalities, behavior and thinking.

In a later study Mead affirmed: “We are forced to conclude that human nature is almost unbelievably malleable, responding accurately and contrastingly to contrasting

cultural conditions.” (Margaret Mead 1935/1963: 289). Together with her husband, Gregory Bateson, she later explored the way Balinese children were formed as ‘cultural characters’ by subtle means (Bateson and Mead 1942). Without explicit references to practice-based learning their study of child-rearing added to a wide range of studies of how children are socialized through observation, imitation and learning from reactions. Many of these studies had a more or less explicit cross-cultural perspective on child-rearing and most often learning was seen as a process of cultural “transmission” (Kimball 1972). In most monographs, we find sections describing how this ‘transmission’ takes place through processes which come close to descriptions of practice-based learning and involves no formal learning or schooling. Children learn by doing, observing, imitating or by being praised and reacted to by grown-ups. This is how Hopi-girls learn to grind corn, Torres Strait children learn to become reef foragers and Mbuti-boys learn to kill animals (Lancy and Grove 2011). The learning is tied to local gender roles as well as different patterns of transitions from toddler to adult. Cultural learning is in most of these monographic descriptions highly structured and tied to local distributions of work tasks tied to status systems, gender and age. Most of the monographs do, however, not take the relation between practice and learning as an explicit focal point of the studies. Learning is used in an explanatory fashion to explain general processes of socialization and cultural transmission.

14.1.2 Cross-Cultural Teaching and Learning

Studies of schooling have developed an explicit interest in exploring the concept of teaching and practice-based learning, often with an underlying criticism of Western school systems. Learning theory tying practice and learning has been connected with studies of children learning e.g. mathematics at the marketplace outside of school (e.g. Lave 1977; Cole et al. 1971; Verran 2001). Many anthropologists collaborated with cultural psychologists and educationalists in order to expose the Western bias on formal schooling as the only road to learning. Anthropological studies of cultural narratives and languages have also drawn upon learning theories (e.g. Goodwin 1993; Harkness 1973; Ochs and Schieffelin 1984). Many of these studies were concerned with the “us/them” dichotomy, which had been established in much general cross-cultural research. These studies often took turns with the different kinds of experiments, testing Western style schooling and learning up against indigenous cultures (following long historical traditions in cross-cultural psychology e.g. the British A.C. Haddon-expedition to Torres Strait, New Guinea, in 1898) (Cole 1996, 42).

The early interests in cultural transmission and (lack of) schooling in different societies in time developed into a strong subfield: “the anthropology of education”. The scope of this field sits, as noted by Brad Levinson and Mica Pollock, “at the crossroads of anthropology as a discipline, schooling as a professional field, and education as a perennial human endeavour” (Levinson and Pollock 2011, 1). The

history and ramifications of the subfield ranges over George and Louise Spindler's cross-cultural fieldwork and their effort to carry what was learned in "exotic places" back into studies of American education (Spindler and Spindler 1982) to studies underlining the civilizing effect of schooling institutions, discussions of cultural transmission, teaching, transfer theory and formal versus informal learning (Lave 2011).

From the 1970s a new interest in studying education and schooling at home in e.g. USA or UK emerged – often driven by very critical approaches to cross-cultural studies commending the Western approach to schooling. Some of these anthropological studies at home challenged notions of the practice of schooling and explicitly included a perspective on practice-based learning *within* schools – often in relation how *not* to succeed in Western schooling and on how Western school culture created "disability" learning (e.g. McDermott 1993; McDermott and Varenne 1995). This kind of anthropology of education does not include formal or informal learning at work-places in general but is limited to studies of schooling. Although many, especially Western, anthropologists have studied schooling abroad (e.g. Levinson et al. 1996), Kathryn Anderson-Levitt has also noted that anthropologists studying education "are more likely to study schooling or learning "at home" rather than "abroad," even in countries where other anthropological studies are conducted away from home" (Anderson-Levitt 2012, 16). Another particular detail is that neither learning nor practice is in general focal points in these studies of Western education. In the comprehensive overview of the anthropology of education, *A Companion to the Anthropology of Education*, we find only one reference to the concept of learning in the register and none for the concept of practice (Levinson and Pollock 2011, 568, 570). Instead we find an interest in education in relation to the structural cultural conditions of educational systems (often national or ethnic), gender, age, politics and language. Even though much has been done in studying the "educated person" (Levinson et al. 1996) the focus in the anthropology of education is still, as Harry Wolcott noted, more on schools as institutions, focused largely on teachers and teaching rather than learners and learning (Wolcott 1982, 86).

14.2 Contributions to General Learning Theory

The anthropological paradigm of practice-based learning has many forerunners in anthropology circling around concepts of practice and learning but only a few anthropologists have studied and developed general theories of learning processes in their own right. The interest in learning theory comprising also adult learning is not new in anthropology, but the issue has always been a niche. In the following section, a selection of anthropological contributions to general learning and practice theory will be discussed.

Harry Wolcott went further than most when he called for more general studies of anthropological learning theories, which could be seen as forerunners of

anthropological studies of practice-based learning such as “learning by osmosis,” “concomitant learning,” “incidental” and “unintended” as well as “latent learning,” “intentional learning” as well as recognizing the importance of Bateson’s “deutero-learning” for anthropological analysis (Wolcott 1982). The main focus on learning in anthropological studies was however limited to discussions of learning as transmission and acquisition of culture in a broad and general perspective rather than on how culture could be tied to everyday practices. Furthermore, the traditional anthropology on learning as transmission focused on specific areas of learning: knowledge, child development, schooling, and cultural continuity but not practice as such (e.g. Kimball 1972; Whiting 1941).

Many, both cultural psychologists and anthropologists interested in learning have been inspired to develop notions of practice through the work of Pierre Bourdieu. He is sometimes referred to as an anthropologist sometimes as a sociologist and not least his early fieldwork among the Kabyle people in the Atlas Mountains has been extremely important for the development of anthropological theories of practice-based learning. Not because he has defined learning – but practice. The logic of practice is not that of a logician – it is a process evolving between habitus and structure (Bourdieu 1990). The anthropologists Dorothy Holland and Jean Lave have discussed his work thoroughly and criticised his lack of learning theory in dealing with the notions of habitus and structures (e.g. Lave 1997). Bourdieu’s theories of practice have, however, been tremendously influential in the development of anthropological theories of practice-based learning and it may be regretted that Bourdieu did not himself develop his work in relation to anthropological theories of learning.

Only a handful of anthropologists concerned themselves with a more general interest in learning theory (Wolcott 1982). One of those was Mead’s husband, Gregory Bateson, who turned out to be one of the most influential of the anthropologists contributing to general learning theory. He developed a special interest in the concept of learning and formulated what is today a widely recognized systemic theory of learning (in the early days named “deutero-learning” and later “learning-to-learn”) (Bateson 1972). Bateson’s learning theory is systemic and cybernetic focusing on change and pattern recognition in a rather abstract manner. Though this contribution was seminal as a contribution to general learning theory, Bateson explicitly denounced the possibility to study learning as everyday practices. He argued that anthropologists, through their specific methods of simultaneously participating in and observing other peoples cultural lives only would be able to formulate new questions (e.g. about learning), which then would have to be tested and answered in laboratories by psychologists (Bateson 1972, 115). Even so the systemic approach to learning he developed has gained renown far beyond anthropology (and is probably even more appreciated in other disciplines like psychology, biology and cybernetics). Bateson’s theory of learning is not about practice, nor is it about culture, but about context. Or rather culture is context and context is not running on “transmission” or “transfer”. Context is classifying the information exchanged and every transaction that takes place between people is in itself a context of learning (Bateson 1972, 246).

14.2.1 *Cultural Models Theory*

Another important contribution to general learning theory, that come closer to practice-based learning, is found in cognitive anthropology. In cognitive anthropology there is an explicit attempt to connect culture, learning, and cognition with studies of everyday activities (Bloch 2012) – and further link these concepts with other relevant psychic processes such as motivation and emotions – in a coherent framework. Cognitive anthropology has been especially interested in the processes creating cultures (e.g. Shweder and LeVine 1984; Shore 1996). Major general contributions to anthropological theory often develop when a small group of people meet and develop their thoughts at a certain physical place. In this case the group of cognitive anthropologists were all more or less connected with the University of California, San Diego in the 1990s (and later dispersed to other universities). Here they developed a specific theory of cultural learning inspired by the cultural anthropology of Margaret Mead, Ruth Benedict, Gregory Bateson and Edward Sapir. Following their work researchers like Roy D’Andrade, Claudia Strauss, Naomi Quinn and Dorothy Holland continued to ask questions about the relations between culture, practice and learning. Together they, with other anthropologists such as Theodore Schwartz, Geoffrey M. White and Cathrine Lutz, developed the anthropological theory of cultural models in works like *Cultural Models in Language and Thought* (Holland and Quinn 1987), *Human Motives and Cultural Models* (D’Andrade and Strauss 1992), and *A Cognitive Theory of Cultural Meaning* (Strauss and Quinn 1997).

Roy D’Andrade has presented an introduction to the field in *The Development of Cognitive Anthropology* (1995). Schematized models not only have potential for directing our acts, but does so in culturally rather stabilizing ways (D’Andrade 1992, 29). Cognitive anthropologists adds three important aspects to the general cognitive theory as well as the actor-network notion of ‘scripts’ and ‘inscriptions’ by refining notion of ‘schemas’ or more complex patterns of schemas named ‘cultural models’. (1) The models for action are cultural in so far we find diversity between cognitive basic schemas found in different ethnic groups and national cultures, but also diversity between groups of scientists, butchers, nurses or other groups, where people learn to form cultural models through their everyday activities. Cultural models are thus tied to ‘doings’ rather than biology, ethnicity or nationality. (2) Basic schemas for how to act are organized in cultural models of ‘self-evident’ connections of knowledge which are learned through every day activities, (3) As learning differs with differences in everyday practice we cannot assume the organisations of cultural knowledge to be equally motivating for all members of an ethnic group or a national culture. Homogeneity must be determined through empirical research.

Once internalised, cultural models ‘fill out’ knowledge about what we perceive with what we expect to perceive. A much used example could be the way young college students expect to be treated on a first date. Knowledge about the course of a dating event is highly cultural. In the American high schools young people have

internalised many expectations which will not be shared by Masai youngsters in Kenya. They do not share the ‘figured world’ (Holland et al. 1998) of how to date.

Cultural models are directive in so far these mental models influences our goals and our feelings about for example using artefacts and organize personal memories around prototypical events, which we might contrast to our own experiences. In this capacity cultural models are “learned internalized patterns of thought-feeling that mediate both the interpretation of on-going experience and the reconstruction of memories” (Strauss 1992a, 3). In this view culture is an ongoing learning process rather than ‘content’ as e.g. material culture. Within this wide framework the more specific theoretical approach of cultural models offers an analytical tool to capture both end-products (cultural models which affects emotions and motivations to act) and processes (learning the connections through which cultural models are formed). What they name ‘cultural models’ are intertwined and organised connections of knowledge about how to act and understand acts formed in activities and “doings”, while models on their part give directive force to certain motivations to act, without making persons ‘cultural dopes’ (Holland and Quinn 1987; Strauss 1992b).

Even so in empirical studies the theories of cultural organizations of knowledge has mainly been applied on our ability to understand and agree with linguistic statements as in proverbs, commercial slogans or abstract general concepts and thus underscore ‘representation’ just like in Cultural Studies. Though this framework also explore the relation between materiality and practice – explicitly developed into an even broader theory of ‘figured worlds’ (Holland et al. 1998) – the emphasis has been on *cognition* more than *practice*. So far cultural model methodology has primarily concentrated on discourse analysis and interviews designed to elicit informants underlying self-evident cognitive schemas (Garro 2007) as well as the more encompassing cultural models or figured worlds. Research has primarily been related to studies of abstract concepts like cultural models of ‘marriage’ and ‘romance’ and “the American Dream”, or on maxims, proverbs, morality tales, and other verbal expressions. (e.g. Strauss and Quinn 1997). The theoretical framework has only in a few studies been connected with empirical studies of how people form the basic cultural models connections in ‘doings’ with material artefacts in cultural practice (e.g. Holland and Cole 1995).

14.3 Work and Practice-Based Learning

Anthropology has a long tradition for studying organisations and institutions but this has rarely been connected with practice-based learning (see e.g. Wright 1994). In the late 1980s another subfield of the discipline of anthropology evolved which proved decisive for developing a concept of practice-based learning – studies of and at workplaces all around the globe. The focus is not just on work, or learning or cultural structures and resources, but on the relations between all of these elements. This work has been inspired by the anthropological interest in apprenticeship-studies that followed the critique of Western systems of schooling. In these studies

there was a focus on practical activity as the way to learn a particular handicraft. For some reason many of these studies emerged in West African anthropologies. Some, like Michael Cole and Jean Lave, conducted formal experiments in order to show how apprenticeship training, along with school training, provided the problem-solving skills needed to solve arithmetic problems (e.g. Cole et al. 1971; Lave 1977). Others like David Lancy studied the skills acquisition in everyday life. Lancy made a study of how the blacksmith craft was learned in a small Kpelle village, Gbarngasuakwelle. He argued that patterns of learning and play come together when Kpelle children learn to acquire the skills possessed by Kpelle adults (1980). Being a skilled worker in this context involves more than we normally would expect from the education of a blacksmith in a Western culture. Learning begins with children playing with sticks and stones and later involves learning about the traditions and customs encapsulated in stories and songs. To become a Kpelle blacksmith the apprentice goes through two kinds of processes. One involves a specified learning process with a local master teaching his pupil about forging. The other, but equally necessary learning process, is much more complex and involves learning through play and other means to combine craftsman skills with the art of being a medicine man and a 'big-man' also tied to the activity of a blacksmith in the Kpelle society. This detailed anthropological analysis is typical of the ethnographic holistic 'wholeness' approach that try not to compartmentalize the world into previously formed Western categorisations. And, as also noted by Lancy, contrary to the cognitive studies conducted by cultural psychologists (e.g. Cole et al. 1971) and other anthropologists like Jean Lave (1977) this study did not study how West African apprentices or children acquired cognitive skills, but how they acquired the practical skills valued in Kpelle society (Lancy 1980, 266).

14.3.1 Learning at Work

From these kinds of anthropological studies of marketplace- and apprenticeship learning a specific approach to studies of work emerged as in for instance the study of the (transformed) practices of Mayan weavers (Greenfield 2004) or the craftsmen building Minarets in Yemen (Marchand 2001).

Many of these studies of practice-based learning in relation to work have been inspired by a group of anthropologists based in Palo Alto, California, not far from San Diego. In their work, studies of West African apprentices met with studies of Americans trying to operate copying machines. Contrary to former anthropological studies of organisations, which often centered around the concept of 'organisational culture' and had a close collaboration with managements studies (Jiménez 2007) the technology-oriented studies at Palo Alto took an interest in both everyday learning, as well as design and practice. The most important contributions emerged from the local institutions: the Work Practice and Technology group at Xerox-PARC

and the Institute for Research on Learning, IRL. Some of these anthropologists had formerly been working with cultural psychologists, but now they moved to a new kind of collaboration with computer scientists, engineers and technology consultants. Anthropologists like Lucy Suchman, Julian Orr, Jeanette Blomberg, and Brigitte Jordan were invited in to study work-practice in order to improve the functioning of the technology (see e.g. Suchman et al. 1999; Jordan 2014). The ethnographic work of Julian Orr on technicians working on copying machines (Orr 1996) has for instance been accentuated as a contribution to workplace research on organizational learning, because his approach point to the connection between “work practices” and organizational learning (Yanow 2006). Many have also been inspired by Lucy Suchman’s eloquent analysis of plans in relation to the everyday situated actions (Suchman 2007). These, and other anthropological approaches have been an acknowledged source of inspiration for organisational scholars (e.g. Czarniawska 2012).

14.3.2 Situated Learning and Practice

One of the main figures in this paradigm of practice-based learning is the anthropologist Jean Lave. Initially she worked within the paradigm of cognitive anthropology and cross-cultural studies of education. Here she met and teamed up with educational cognitive psychologists working in West-Africa as Michael Cole, who just like she did, conducted small experiments with informants to find out about the difference between formal and informal learning. In a testimony over her lifelong development as an anthropologist she explains how her work among the Vai and Gola tailors of Happy Corner, Monrovia, in Liberia gradually moved her away from perceiving learning as either formal (in schools) or informal (as apprentices learned from their masters). Instead she asks “what if learning is all there is?” (Lave 2011, xx) and gradually came to acknowledge that learning is ubiquitous. In other words she dissolved the dichotomy between informal and formal learning. Learning takes place all the time and everywhere and affects not only knowledge, language and individual identities but whole communities of learners.

In her early studies of learning mathematics in everyday life in Orange County, California, Lave (1988) argues against a notion of cognition as an abstract knowledge people can possess (a knowledge poured into a container). Mathematical insight is rather a knowing in a practice, learned within that practice. Far from being detached ‘encyclopedic’ knowledge, situated knowledge arises with the needs of a particular practice. This approach may explain why people may be excellent at calculating numbers when engaged in counting calories in commodities at a supermarket whereas the same kind of calculations poses problems when they are confronted at a school setting, which present the insights of mathematics as purely abstracted knowledge. In the empirical study Lave and her colleagues for instance follow a class of Weight Watch participants in kitchens and

supermarkets. It turns out they use even quite advanced mathematics with ease as long as it is connected with their Weight Watch program. The conclusion drawn by Lave is that rather than talking about knowledge as abstracted from everyday experiences, “knowledge takes on the character of the process of knowing” (1988, 175). In 1987 Jean Lave visited the learning-center at the Xerox-financed IRL and here she teamed up with the computer scientists Etienne Wenger. Together they wrote the most influential books in the anthropological paradigm of practice-based learning: *Situated Learning: Legitimate Peripheral Participation* (1991). In this book a theory of learning as practice-based ‘legitimate peripheral participation’ in communities of practice was introduced. The book built partly on Lave’s earlier work of apprenticeship learning in West Africa (e.g. Lave 1977) but also involved a number of studies in which people learned ‘ubiquitously’ without formal schooling as they engaged themselves in various everyday practices. Learning is not confined to specific ‘learning settings’ or formal learning situations, it is argued. Ubiquitous learning is often unrecognized and involves changes in knowledge and actions as we learn in ongoing activities. These changes are central to what is meant by ‘learning’ (Lave 1993, 5). This approach makes it possible to move learning outside of the classroom and into the practice-based learning that take place in everyday life including workplaces. People may learn through direct guidance of their more experienced colleagues or more skilled peers but often learning comes about without any explicit instruction – simply through observations and doings in the course of an evolving identity and membership in a community engaged in a particular local practice.

The notion of learning in everyday apprenticeship-like situations on the shop-floor, which could be studied through ethnographic methods of participant observation, became immensely popular in work place studies of practice-based learning. In the uptakes learning became an issue in relation to occupational practice and it is discussed as a practice-based learning which makes no distinction ‘between engaging in practice and learning’ (Billett 2010, 2). Communities of practice are not just sites for learning particular skills, but places where identities, knowledge, activities, languages and artefacts are formed through situated learning processes (Lave and Wenger 1991, 52–54). The particular anthropological interest in practice-based learning is influenced by the cultural learning tied to everyday practices (Greenfield 2007). Often these anthropological endeavours are not distinguishable from how cultural psychologists, like e.g. Patricia Greenfield and Barbara Rogoff, have dealt with culture and apprenticeship in relation to learning.

In the paradigm of practice-based learning one of the important contribution is the ethnographic approach shared by anthropologists and cultural psychologists alike that help keep the physical, culturally constructed setting in mind and the material objects that help constitute social space and thus focus on the evolving learning of everyday life, that may be “the blind spot” of many other types of organizational studies (Yanow 2006, 1751). Another contribution is the integration of learning, practice and cultural diversity – an area which may still be developed further in organisational studies.

14.3.3 *Distributed Cognition*

At the same university in San Diego where Roy D'Andrade developed his theory of cultural models and Holland and Lave visited Michael Cole's Laboratory for Comparative Human Cognition, another anthropologist began to study what comes close to studies of practice-based learning at work. For this anthropologist, Ed Hutchins, the main interest was to understand human cognition in social, cultural and material contexts and this implied studying learning in relation to *Cognition in the Wild* (Hutchins 1995). Like so many other American anthropologists, Ed Hutchins takes turns with the general dominating cognitive science, which, he claims, "leads to a serious overattribution of knowledge to individual actors" and thus overlook that "when context is ignored, it is impossible to see the contribution of structure in the environment, in artifacts, and in other people to the organization of mental processes" (Hutchins 1993, 63).

The 'wild' refers to studies of everyday life outside of laboratories and this comes close to a practice-based learning approach. Hutchins' studies focus on the distributed cognition in practical activities (as navigating ships) thus emphasizing an integrative approach to learning in cultural (human and material) communities. On board huge ships the captain's cognition differs from the deck clerks but it is through the distributed cognition between them and their tools that the ship is sailing. Learning is not tied to individual minds but to reconfigured arrangements of knowledge distributed among people engaged in different tasks as well as the artefacts in use.

Hutchins empirical work often concerns the working of complex systems of human-technology relations, which e.g. enables huge ships to sail (Hutchins 1995) and aeroplanes to fly. Parting from traditional understandings of cognition as information processing the practice-based approach taken by Hutchins led to an identification of cognition as distributed (Hutchins 1995). In one such case Hutchins recounts a detailed description of a large ship, USS Palau, which, while it was sailing into a harbour in San Diego, ran into a problem with some of the navigational equipment and a breakdown of electrical power. In the ensuing work-situations the navigation team answers to this situation. Hutchins notes, that one normally expects that work situations on big ships are organised in accordance with plans, which may ensure that even in times of a crisis the organisational structures support reflected and efficient answers to a crisis. Instead the crew and their equipment answer by an intricate system of adaptations spread across human and material artefacts to avoid a collision with a sailboat and a buyer. The collisions are avoided. Not because of separate individuals reflections, but rather through the reactions of a systemic whole (Hutchins 1991).

In work settings the boundaries between group and individual is dissolved in this approach and the distributed cognition furthermore involves both material artefacts and representations. In distributed cognitive systems no one person (nor any one technological artefact) has the full overview of a situation. In order to get USS Palau safely into harbour, no one – not even the captain or the technical instruments – have the full overview of the situation and what plans to be executed.

In distributed cognitive systems each individual and each machine contribute with dispersed and differentiated understandings of the situation. It is when they come together and adapt to each other that a solution emerges to solve the crisis. In the cognitive system described by Hutchins the distributed cognition may be analysed based on several levels of learning. The individual captain or helmsman learn in relation to each other or in relation to their instruments, or including their relation to all others and all the relevant instruments. The knowledge possessed by humans and machines is variant and collaborates with different kinds of knowledges and resources. Thus access to each others responses and resources is of huge importance for the possibility for the whole system to respond to a crisis. In the reported case USS Palau was successfully shored at its berth – but the success would not be attributed to any individual, nor to a group of persons or materiality, but to the whole interacting system of distributed cognition.

Hutchins makes a special case of how practice-based learning is tied to this system of varied cognitions working together. Learning happens in culturally informed doings (Hutchins 1995). Once learned cultural relations to artefacts and other people become a self-evident horizon for our range of actions. Artefacts and humans are in this respect simultaneously extensions of the individual knowledgeable body engaged in an activity (as e.g. avoiding that a large ship collide with a buyer) and one node in an extended distributed system of human and non-human cognition about how to act in unison.

14.3.4 Material Artefacts and Bodily Practices

Another anthropologist, who has expressed admiration for Hutchins concept of distributed cognition, is the anthropologist Bruno Latour, who goes even father in attributing agency to material artefacts. Although he does not operate with an explicit notion of practice-based learning some have remedied this and developed theories of how practice-based learning and materiality may be connected with Latour's actor-network-theory and theory of socio-material assemblages (Latour 2005) – most notably Estrid Sørensen (2009) and Tara Fenwick and Richard Edwards (Fenwick and Edwards 2010). Like Bourdieu before him Latour only sporadically contribute to theories of practice-based learning. Most notably this perspective is unfolded in an essay of body and learning to e.g. become a taster of perfume in France (getting the 'nose' (*un nez*) which selects good perfume from bad). Latour claims that being sensually affected is related to learning. This is: "especially salient when we compare what happens to a pupil learning to become a 'nose' with what happens to her teacher devising his odour kit through a long enquiry among 2000 untutored 'noses', and with what happens to the chemists when they try to build instruments and apparatus to register chemical differences in the various disciplines surrounding the industrial branch of perfume manufacturing. Each of these different actors can be defined *as bodies learning to*

be affected by hitherto unregistrable differences through the mediation of an artificially created set-up." (Latour 2004, 209, italics by the author). Affection is learned in ways which gradually make us more sensitive to differences in for instance the tastes of wine and perfume scents.

The sensuous approach to learning is even more evident in the works of Tim Ingold. There are many likenesses between them though Ingold explicitly distance himself from the work of Latour (in one occasion he, with a witty pun describes this difference as the one between an ANT (pun referring to Latour's 'actor-network-theory') and a SPIDER (referring to his own 'meshwork' theory)) (Ingold 2011a). Though Ingold shares Latour's interest in materiality his approach is much more connected to how humans dwell in the worlds through which we physically move (Ingold 2000). Inspired by phenomenological theories Ingold unfold how practice-based learning is tied to these emergences and intricate webs of materials (rather than materiality), bodily engagements and movements in environments. Drawing on an extensive knowledge of anthropological monographic descriptions of how people all around the world learn to engage with the animals they herd, the plants they harvest, the baskets they weave and the lines they create, Ingold argues that sensory perception and practical activity inform each other (Ingold 2011a, 31).

Dwelling does not imply that humans snuggle up in cosy caves of dwelling free of struggles for space and power games. What is fundamental to the dwelling perspective is "the thesis that the production of life involves the unfolding of a field of relations that crosscuts the boundary between human and non-human" (Ingold 2005, 503). Furthermore, this unfolding is not following explicit rules nor is it depending on reflections. Often rather the opposite is the case.

Ingold for instance describe a seminar with anthropologist and craftsperson Stephanie Bunn. Bunn is an expert on weaving and basket making. At the seminar the participants are asked to make a particularly decorative knot, named a 'Turk's head'. Ingold notes: "Trying to do this from step-by-step diagrams proved virtually impossible" (Ingold 2011b, 7). The participants can see the pattern of the completed knot in the printed material but they do not understand how the knot is made. "The path to understanding lay in the ability to grasp the knot, intuitively and by way of our bodies, as a composition of rhythmic movement. Only then could we find a way forward. The diagrams, in turn, only made sense when we looked back on what we had already done. Thus the argument from design explains too little because it does not account for the intuitive, inventive component of skilled practice." (Ingold 2011b, 7).

Our engagements with places (and we could add 'workplaces') are like knots, Ingold argues. The threads from which they are tied, "are lines of wayfaring" (Ingold 2011a, 149). These lines constitute a 'meshwork' Ingold argues – borrowing a phrase from Henri Lefebvre. In meshwork we learn intuitively to tie the knots of everyday activities. Following Bunn (as Ingold does):

We may see the pattern in our mind's eye, but we do it, we know it, we embrace it through the movement of our bodies (Bunn 1999, 26).

14.4 Method and Methodologies

The method of fieldwork is a cornerstone in the anthropological paradigm of practice-based learning. Ideally we could argue, that all of the above perspectives of practice-based learning, also formed a cornerstone in the ethnographic methodology so important for anthropological theorizing. This is however not the case. The anthropological understanding of fieldwork has only slowly been connected with theories of practice-based learning.

The importance of fieldwork in itself constituted a paradigm-shift in anthropology, in the Kuhnian sense, from Malinowski and onwards, which in anthropology emerged out of a showdown with both ‘armchair’ ethnography and an anthropology of comparison, replacing them with the anthropologists armed with suitcases prepared for long stays aiming at understanding the natives point of view (Sanday 1979, 527).

This implies first of all a positioned and legitimate presence, which makes observations possible. The legitimate presence refers to the acknowledged position of an ethnographer in other people’s practiced everyday life. Positioned refer to the physical presence of the ethnographer in places which not only allow observation of other peoples practices but also include a social designation of what makes activities meaningful. Sometimes the legitimate position even allows the ethnographer to engage in the observed activities (see e.g. Hasse 2002, 2008). The legitimate presence of the ethnographer also implies the possibility to move around in order to get many different impressions of what kind of cultural structures and resources are implied in learning for instance at work. This holistic approach makes it possible to follow unexpected connections, which were not beforehand envisioned by the researcher. David Lancy not only studied the blacksmith as his forge, where grown-ups and children met to watch and gossip but also followed the children out in the field, where they played ‘blacksmith’ with sticks and stones. This gave unexpected insights into how being a blacksmith and childhood learning was connected. The anthropologists might even herself be allowed to participate in limited activities, but it is not a necessity to make a comprehensive analysis of how others learn in practice. The apprentices in Lave’s study at Happy Corner can be observed to become more and more skillful as they move through the different stages tied to the sowing of a jacket. And in their talk words and worlds of identities are changing. Likewise the practice of anthropology is itself moving as anthropologists learn from their ‘doings’ in the field and at the writing desk. Thus the discipline of anthropology is in many ways depending on the anthropologist being a kind of learning apprentice (Lave 2011). Culture is in this perspective most often learned without being taught. Just like children in many cultures around the world learn to grow up as cultural beings without any formal teaching (Lancy et al. 2010) anthropologists may learn about other people’s cultures through ‘ubiquitous’ learning. What is analysed as ‘culture’ could be seen as the result of the anthropologist/ethnographers practice-based learning processes. The concept of culture is today acknowledged as a category of thought rather than a bounded and tangible entity as it was in

the days when monographs discussed learning as cultural transmission. This has shifted the conception of the anthropological object. Holism found in anthropological analysis must be reinvented. Today anthropologists generally acknowledge that “[t]he whole studied or made manifest by anthropology is not a reifiable entity, but a space that embraces the process of knowledge production itself” (Hastrup and Hervik 1994, 2). This opens up for a new understanding of practice-based learning, which also includes the practice of ethnographic work as a kind of practice-based learning. The anthropologist as a learner is discussed in Lave’s book on the anthropologist as an apprentice in critical ethnographic practice (2011). If there is no ‘formal’ or ‘informal’ learning to be studied but only context-embedded situated activities (ibid., 145), where does that leave the researcher studying other people’s practice-based activities? Jean Lave opens up this discussion, but she does not close it with answers. Lave describes herself as an apprentice in critical ethnography – learning from her informants and her colleagues as well. What is then the difference in learning as a Vai apprentice engaged in cutting and sowing and learning as the observing anthropologists engaged in noting and writing? Why do groups of anthropologists emerging from San Diego or Palo Alto develop similar theories on learning, cognition and practice? Lave has elsewhere underlined that “[r]elational concepts of the social world should not be explored in isolation from conceptions of persons acting and interacting and their activities,” (Lave 1993, 5). These findings could be explored further from the perspective of the ethnographers’ practice-based learning.

14.5 The Next Anthropological Paradigm

This may also call for a new distinction between ‘anthropology’ and ‘ethnography’ – which is often explained as the distinction between the overarching anthropological theorizing and the ethnographic description (Ingold 2011, 231). The anthropological concept of practice-based learning has itself emerged in a continuous learning process drawing on all of the ethnographic studies of work, of apprenticeship, of schooling ‘home and abroad’, and children’s everyday learning as well as general learning theory. More work on practice-based learning is needed in anthropology just as we still need to explore the relations between the work of ethnographers and how their empirical studies and anthropological analysis may be connected to a concept of practice-based learning.

The anthropological contribution to the general field of workplace learning and practice-based learning at work has been twofold. Anthropologists have inspired fieldwork in local settings, where it is possible for a researcher to move among people doing and working in practice. Anthropological theory stemming from this kind of close-up ‘micro-studies’ have inspired theorizing about how people learn and learn to know in doings with each other and material artefacts. These influences are apparent in much work on practice-based learning, notably Billett (2004), Strati (2007), Gherardi et al. (2007), Gherardi (2000), Nicolini et al. (2003), Yanow

(2006), Orlikowski (2007), Czarniawska (2012) as well as cultural psychologists (e.g. Cole 1996; Sørensen 2009).

Not least Jean Lave's contributions and her underscoring of a focus of situated 'knowing' rather than the Cartesian abstracted 'knowledge' (1988, 175) has influenced the field of studies of practice-based learning at work.

Paradoxically this development has evolved together with an increasingly critical approach to how anthropology understands and develops its own methodology. One of the sharpest critics is professor emeritus from London School of Economics, Maurice Bloch, who claim that anthropology is "anecdotally at the ethnographic level, but at the theoretical level not systematically tested and simply left to float in never never land. This incoherent fragmentation, in any and every direction, so long as it will find favour with funding bodies and seems relevant to the concerns of the moment, makes the existence of anthropology departments as working units difficult to justify" (Bloch 2005, 2).

Though learning with material artefacts often plays a major role in many these studies, and everyday practice-based learning is often set up against the formal learning of schools, the main focus is not on material practices but on cognition and situated learning as a cultural and historical development. In the most practice-based areas of this line of research, cultural psychologists (like Michael Cole) often joined forces with the anthropologists (e.g. like Jean Lave or Dorothy Holland) using e.g. cultural historical Vygotsky-inspired theory as a bridge-builder (e.g. Holland and Cole 1995). Together these psychologists and anthropologists (as well as contributors from other disciplines) formed the field of cultural psychology (Jahoda 1982). In time this cross-field of cultural psychology/cognitive anthropology developed an anthropological interest in studying cognition in practice (e.g. D'Andrade 1995; Hutchins 1993; Strauss and Quinn 1994; Garro 2007). There are many scattered and important contributions to the development of the more coherent framework called for by Bloch. The theory of situated learning is so far the most connected and comprehensive, covering a major group of anthropologists who were working more or less together in California during the 1980s and 1990s, knowing and learning from each other in intricate and complex ways (Jean Lave, Julian Orr, Lucy Suchman, Ed Hutchins, Dorothy Holland to mention a few). Interestingly this group of American anthropologists have often taken a showdown with the cognitive sciences as a basis for developing their own theories. Equally interestingly the group of European anthropologists working on theories connected to practice-based learning appear even more scattered. Even though e.g. Ingold refers to e.g. Latour and Bateson (who is to be considered both 'American' and 'British' in this context) no coherent framework has been developed. What the European anthropologists share (if anything) seems to be a much more keen interest in practice-based learning in relation to materiality than in relation to cognition. Though there are notable exceptions (like Ed Hutchins and Lucy Suchman focussing on materiality and Maurice Bloch on cognition) no attempts have been made so far to seriously connect the theories of cultural models, discourse and practice-based learning with theories of material artefacts to combine these into a coherent theory of patterns of self-evident meaning

in activity. This might be the next important step in the development of the anthropological paradigm of practice-based learning.

How should we study practice based learning within the paradigm of anthropology? Following recent discussions within the field we might stand before a new paradigmatic shift. Not because fieldwork and participant observation is abandoned, but because we have to find new ways of explaining, what it is that ethnographers do.

Since 1970s it has been a dictum that the ethnographer *writes* (Geertz 1973, 19). This is how anthropology is made. This has called for a problematisation of the dichotomy in fieldwork between ‘participation’ and ‘observation’. As noted by Ingold, most anthropologists believe the ethnographer in the field *turns away* in order to write observations down – but this view on ethnography is much too limited. The real problem with ethnography “lies not in the alleged contradiction between participation and observation, which is a chimera, but in the disconnection of the art of description from observational practice”. (Ingold, 2011a, 224). Doing ethnography could be perceived as a learning practice in itself. In the ‘anthropology’ called for by Ingold the ethnographer is moving in the field, observing and describing by following the materials people work with, copying the gestures they make and drawing the lines in handwriting and drawing, which present their world to us – not as a coherent whole but as lines drawn.

Ethnographers do not claim to capture the world (which could be a workplace) they study in its totality. They are engaged in this world and as such carry it “*forward*, in real time, in concert with the movements of the worlding world, in an ever-unfolding relation between observant eyes, gesturing hands and their descriptive trace” (ibid., 225).

This is indeed a beautiful vision, which has a lot to offer to the field of workplace studies and practice-based learning. Ingold’s studies are intimate studies of learning how e.g. to tie the knot of the Turk’s head. When we span the whole landscape of the anthropological paradigm of practice-based learning some questions remain, however. What is implied in the theories of cultural models is that culture may be *found* (Quinn 2005). There are ‘default values’ to be filled out by the ethnographer, when people engage in knot-work. They are there in other peoples cultural models about self-evident doings. The visiting ethnographer is not a usual newcomer, but a learner who has to learn how to better understand what is so self-evident for the people visited. In this sense the knot-work is a puzzle. It is maybe only recognized as a puzzle by the ethnographer, but other newcomers may wonder as well why people do as they do in such self-evident ways. Something which cannot be seen with the naked eye is at stake. Something which may be learned when the ethnographer engages herself in a situated practice to learn. Engaged in this learning process we learn from actions and reactions from humans and non-humans. We use our senses as well as the material resources available to us and gradually learn to make connections and form our own new self-evident cultural models of what to expect in a workplace setting which become more and more familiar to us. This certainly might be done by doing what the other participants do. When we talk workplace studies this might be difficult, however. Not any new coming anthropologist is trusted with using a pair of scissors in order to cut up expensive cloth, nor

hammering iron without the appropriate skills. In some situations the ethnographers may be enrolled as an apprentice among other apprentices (Hasse 2008), but most often ethnographers will have to make do with observation and talking. It is a process of movement as well as of halts in which ethnography only gradually become with and not of the people studied. When we learn about their lives and work with materials, sensualities and social quibbles and victories we also learn about our own lives. In this sense anthropology is inherently comparative. Talk, materiality and sensuous movement together with an acknowledgement of just how difficult it is to practice ethnography may be the combined approach needed in a new anthropological paradigm of practice-based learning, which includes studies of work as well as a methodology for doing fieldwork.

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Part III

Educational Institutions and Systems

This part comprises contributions identifying the purposes and processes (i.e. curriculum and pedagogy) used by educational institutions to initially prepare professional practitioners and then maintain their competence across working lives. So, included here are selected accounts of the way educational systems have been organised and enacted to secure professional learning outcomes and what kinds of conceptions of curriculum and curriculum practices are utilised in securing effective professional capacities through educational institutions and systems. In his chapter – *Professional education between school and practice settings: The German dual system as an example* (Chap. 15) – , Peter Sloane provides analysis of the German dual system as a means of securing co-operation between and support for learning across school and practice settings and in doing so identifies key lessons for professional education. Emphasising the three elements of the didactic, organisational and governance factors, he elaborates an explanatory scheme comprising both vertical and horizontal dimensions of cooperation. He holds that, given the incommensurable environments that comprise these two settings, and their distinct rationales, that issues associated with reconciling organisation and governance imperatives, and are central concern for didactical issues within these reconciliations is central to how this functioning cooperation is an active and sustained. It is these factors and principles informing this cooperation which he holds have specific implications for professional education. Focusing on the same set of educational practices, in their paper – *The dual system of vocational education and training in Germany: What can be learnt about education for (other) professions* (Chap. 16) – Bärbel Fürstenau, Matthias Pilz and Philipp Gonon offer an account of how this education system has transformed over time in response to changes to stakeholders' needs and circumstances of its enactment. Changing concerns about the cost to enterprises of this system of education, and how its utility for those enterprises can be sustained are discussed, as is the ongoing concerns about the parity of standing between not only general and vocational education, but across different kinds of occupations. In this way, the central concern of this system about the integration of work and learning is set amongst sets of concerns which are both highly situated, but also embrace

broader societal concerns about educational worth. Madeleine Abrandt Dahlgren, Tone Dyrdal Solbrekke, Berit Karseth, and Sofia Nyström also address issues associated with relations between the provision of education and the practice of the occupation. In their chapter – *From university to professional practice: Students as journeymen between cultures of education and work* (Chap. 17) – they identify some consequences of the different ways that professional education is organised and enacted in terms of professional identity formation and professional responsibilities. A key focus for this chapter is the ways educational system provides a pathway for students as they transition from being students to practitioners, through a process of negotiating two distinct cultures: education and work. These transitions are held to be set within and enmeshed within these two distinct sets of cultural practices. In this way, this chapter explores the different level the relations between those participating in educational systems and what those systems afford.

This theme of providing and integrating experiences across educational and practice settings is also the explicit focus of Stephen Billett and Sarojni Choy's chapter – *Integrating professional learning experiences across university and practice settings* (Chap. 18). Given the concerns about the integration of the two sets of experiences in contemporary tertiary and higher education this contributions seeks to identify what are the premises for providing experiences in both settings and seeking to integrate and reconcile them to make more effective the provision of professional education. Drawing upon conceptions from socio-cultural perspectives and curriculum theory, this chapter seeks to offer curriculum and pedagogies premises for ordering and enacting experiences that will intentionally promote the reconciliation of experiences students have in both settings as directed towards a more effective utilisation of those experiences and rich learning outcomes. Effective transitions from professional education are also the focus of Päivi Tynjälä and Jennifer Newton's chapter entitled – *Transitions to working life: Securing professional competence* (Chap. 19). Quite specifically, they identify a series of challenges that graduates report confronting in the early stages of their careers and which positions these transitions as being able to negotiate (successfully) these challenges. Focusing on the challenges associated with being able to secure employment, the adequacy of their knowledge and skills, their efficiency and ability to manage stressful work lives and the formation of professional identity set within working contexts that can be characterised by high attrition rates and transforming occupational practices, this chapter elaborates all of these within a consideration of professional competence. These challenges are illustrated by drawing upon experiences of student nurses' transitions into working within health care settings which illustrate these challenges and the means by which they stand to be negotiated a process which constitutes these transitions.

One of the key goals for individual and workplace professional practice is for greater interprofessional working. This then has become a key focus for education and in particular an emphasis on interprofessional education. In that chapter, Elizabeth Molloy, Louise Greenstock, Patrick Fiddes, Catriona Fraser and Peter Brooks elaborate the issues associated with – *Interprofessional education in the health workplace*

(Chap. 20). Using medical students' experiences of interprofessional working within clinical settings, this chapter identifies the ways in which practice factors and the standing and agency of medical students although key factors in interprofessional working and learning, often inhibited the potential of these experiences and potential for effective and long-term interprofessional working. Faced with new challenges as student and novice doctors, goals for interprofessional education were soon displaced by others associated with professional concerns and development as they exercise what they might describe as necessary resistance. In all, the evidence suggests that easy optimism about the efficacy of interprofessional education leading to more effective cross disciplinary and occupational working through such means may well be misplaced.

Staying within health care, Tim Dornan and Pim W. Teunissen chapter entitled – *Medical education* (Chap. 21) – again examines experiences in practice settings as a means of educating the next generation of doctors, including their motivations as well as the limitations of an overly technically focused medical education curriculum. The authors note that the conceptual bases for understanding medical education processes are now expanding and maturing. They use these bases to understand the identity development of new doctors and offer models (i.e. Professionals learning within practice and the boundaries of practice) about the pathways and transitions towards these nascent doctors formation of a stable occupational identity. Aligning a view about educational systems with the needs of those participating in them is central to the chapter entitled – *A phenomenographic way of seeing and developing professional learning* (Chap. 22) – by Ming Fai Pang. As this title implies, he adopts an orientation focused on the way in which professional learning is experienced by workers and students and how they come to know and respond to particular situations and settings. While focusing upon the experiencing and sense making of the learners, from this account and orientation, comes the suggestion about the ways in which particular sets of experiences might be engage with and have particular consequences for students as learners. That is, the ordering of experiences and their consequences for these learners. Curriculum and instructional considerations and consequences are elaborated in this chapter with a particular focus on the development of teachers' professional capacities.

Finally, in this part on education systems, Monika Nerland and Karen Jensen refer explicitly to the knowledge cultures that exist within particular kinds of social practice and professionals learning in education and work settings. Their chapter, entitled – *Changing cultures of knowledge and professional learning* (Chap. 23) – focuses on particular kinds of epistemic objects and practices (including educational systems) and how these contribute to professional learning. The central concern here is developing 'epistemic fluency' – how learners can come to know and engage epistemologically to initially learn professional practice and then to further develop it through engagement in practice. In all, the analysis here is offered of the way in which knowledge cultures afford opportunities for learning in particular ways and how a broad understanding of these cultures can assist the provision of and engagement experiences associated with professional learning.

Chapter 15

Professional Education Between School and Practice Settings: The German Dual System as an Example

Peter F.E. Sloane

Abstract This chapter uses the case of the dual system in Germany to derive general and exemplary conclusions for co-operation between school and practice settings in professional education. It can be shown that co-operation between two learning settings as unequal as enterprises and schools does not come by default. It needs to be organized taking into account didactical, organisational and governance dimensions. The dual system is used to illustrate how these dimensions impact vertical and horizontal co-operation on four distinguishable action levels: macro-, exo-, meso- and micro-level. Characterising schools and enterprises as incommensurable living environments is then used to shape the requirements for didactical designs, which leverage the fact that learners in the dual system cross the borders between these settings regularly. Here it is pointed out that each setting is constituted by distinct rationalities and both have a theoretical and practical dimension. If co-operation is still to be fostered, school and enterprise actors need to find a 'higher standard', which can be used to design sequences of instructions in the alternating settings. Therefore the learners perspective is to be considered. Finally a ladder-model of co-operation in vocational education and training is employed to systematise best practices for co-operation between school and practice settings.

Keywords Co-operation • Didactics • Institutions • Dual system • Curriculum • Theory • Practice

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15.1 Introduction

Professional Education takes place at different settings. In this chapter vocational education and training (VET) in Germany is taken as an example to elaborate the potential and problems that occur when different settings are to be linked, because learners cross the borders between these settings. These considerations are of particular relevance when learning at schools and enterprises is at stake.

15.1.1 Starting Points: Learning in Different Environments

With an open-minded view of the world, what would we see if we looked at different learning arrangements in schools and enterprises? Let us imagine that vocational education is fostered in schools and enterprises. Teachers would instruct students and trainers would work together with employees. There would be a typical classroom, on the one hand, and a working environment on the other. Maybe we would recognise differences in the ways students and teachers interact, compared with trainers and employees. And possibly we would have the impression that enterprises are real-life settings and schools are preparing students for this real life.

However, at the latest at this point we have to acknowledge the assumptions we have made: Depicting an enterprise as a real-life setting where learning goes on is such a theoretical assumption, as well as the idea that schools and enterprises do something called vocational education. And, of course, we can try out different lenses to point out specific characteristics, but also similarities, of these two learning environments.

In an initial step we can define four layers to describe these two learning environments:

- 1st We can look at the *micro-level* of schools and enterprises. This means that we can compare the teaching and learning arrangement (class-room-setting) of schools with the working arrangement (job-setting) of enterprises. This leads to questions according to the learning approaches and the instructional designs in these different environments. At this level we see vocational education as a *learning approach* and an *instructional design*.
- 2nd We can analyse the different organisational structures of schools and enterprises looking for regulations, incentive systems, objectives, and so on, which, to a certain extent, regulate the possibilities to learn. This is called the *meso-level*. This is the *organisational setting* of vocational education.
- 3rd Schools and enterprises are not situated in neutral zones. They are always part of social life and are embedded in a network of regulations. In the school sector these are school authorities, normally a national administration system. The regulations for enterprises differ between countries. We have market-driven systems where enterprises primarily have to cope with the market and can

decide freely what they want to do with regard to learning. They mostly follow a market rationale. But there are also countries such as Germany, Switzerland, Austria and the Scandinavian countries where there are certain regulations for teaching and learning in enterprises. Therefore, we have to separate an *exo-level* which frames the learning and teaching activities in schools and enterprises. Vocational education is seen as an *institutional system*.

4th Finally, we can state that the administration (macro-level) is the result of political decisions in each country. This *macro-level* refers to the governance approach and is the institutional background of education. Vocational education follows a *governance approach*.

The differentiation of vocational education into these four layers: micro-level, meso-level, exo-level, macro-level was introduced by Uri Bronfenbrenner (cf. 1979). It makes it possible to separate different acting levels and show the interdependencies between the levels. There is some kind of *vertical co-ordination* between the layers.

Nevertheless, we are looking at two different settings. On the one hand, there are schools with their school organisation, embedded in an institutional system based on national agreements about what has to be taught, and by whom in school. On the other hand, there are enterprises that also carry out vocational education, based on the already mentioned market rationale and with the aim of achieving economic advantages through this work. Furthermore, there are differences in the institutional background, the organisational settings and, finally, of course in the different instructional approaches. This would be an interesting task in itself. However, it becomes more sophisticated when we take another perspective and look at students and workers who move between schools and enterprises. In other words, we do not look at the structure of both school and enterprise and work out differences and similarities. Instead in this chapter, we look at individual careers and ask what kind of changes happen if someone learns in schools as well as in enterprises.

These changes between the two so-called *learning places* can happen in different ways:

- It can be a biographical experience: a student enters work after finishing schooling, and continues learning in the enterprise.
- It can be part of a programme in vocational education and training. Here, there are three possible approaches (cf. Greinert 2004, 20 ff.):
 - It is a school-driven programme with phases of practical experience. This would be typical for vocational colleges in, for example, France or Finland. In the following this is defined as the *school-based approach*.
 - It is an enterprise-driven programme with seminars and workshops organised for the trainees. This is typical for big enterprises. In the UK this kind of programme is run by Rolls Royce. It is called the *enterprise-based approach*.
 - It could be a co-operative programme from enterprises and schools. This is the German *dual approach*, called the dual system (cf. also Raggatt 1988 and Deissinger and Hellwig 2005, 312 f.).

Action Layer	Acting Context (Field)	Learning Places	
		School	Enterprise
Macro-Level	Policy	Governance	
Exo-Level	Administration	National authorities	Market/Chamber ¹
Meso-Level	Organisation	School	Enterprise
Micro-Level	Working/Learning	Classroom	Working place
<i>Horizontal Co-Operation</i>			

Fig. 15.1 Vocational Education (VET) as an ecological system

If we look at the object ‘vocational education and training’ from the perspective of the learner who moves through different learning arrangements than we can ask the following questions on professional education:¹

- 1st Can school-based and work-based learning be linked together? This is a matter of co-operation between teachers at schools and trainers at enterprises. The concrete co-operation depends on the specific circumstances of each learning place and the co-operation needs. These depend on the sort of programme. There are different needs according to whether it is school- based, enterprise-based or has a dual approach.
- 2nd As the learning is embedded in different learning places can there be pathways between these different places? Can these pathways be built up? In other words: How is the co-operation between school and enterprise as specific social organisations organised?
- 3rd As schools and enterprises follow different regulations (institutions) it is necessary to compare the institutional background of the learning places and look for connections between these requirements. If the movement between school and enterprise is institutionalised in a dual programme it is mandatory to develop new regulations. In social systems where dual approaches are already established these regulations already exist.

Considering this necessary horizontal co-operation the BRONFENBRENNER model has to be further developed to become a bilateral co-operation approach. Therefore the four different layers – micro-, meso-, exo- and macro-level – are not only linked to a corresponding field of action – such as working/learning, organisation, administration and policy – but are also distinguished for both learning places. Here the learning places ‘school’ and ‘enterprise’ are further explored, by specifying each layer separately. In addition to that vertical and horizontal dimensions of co-operation need to be considered (see Fig. 15.1). How this complex framework will be developed throughout this chapter is described in the following Section.

¹As is shown later on, VET in enterprises can also have a specific administration. It is, for example, part of the German governance approach to regulate VET in enterprises. The chambers have the function of public authorities in regulating the education work going on in enterprises.

15.1.2 Vertical and Horizontal Co-operation in Vocational Education and Training

To develop a framework for co-operation on different levels, I will discuss the vertical and horizontal co-operation, which occurs when a systematic connection between schools and enterprises is established. This will be discussed on the basis of the German dual system, which is taken as a case study to illustrate the complex nexus of highly specific individual aspects. Such single objects are: the instructional approach in enterprises, the syllabus types in the school and in the enterprise sector, the incentives in school and in enterprises, the organisation of work in enterprises, the school organisation, the profession of teachers and trainers and so on. Research has been undertaken in each of these aspects and of course into many objects not mentioned here. The point of view in this paper is the question of how these single aspects work together in the complex world of vocational education.

The German dual system is the broadest approach. It covers the school approach and the enterprise approach to a certain extent. Thus, these sub-approaches can be illustrated in the case of the dual system as special applications.

In this contribution, the German dual system will be examined as a case for a co-operative training programme where schools and enterprises work together in joint programmes on vocational education and training. Therefore, the background of the so-called dual system will be summarised and the kind of co-operation established in this system will be detailed (Sect. 15.2). After that the theoretical approaches towards co-operation will be discussed (Sect. 15.3).

15.2 The Case: The German Dual System

In Germany, initial vocational training is organised into three different pillars: (1) the so-called dual system, in which enterprises and schools run a co-operative programme, (2) school-based VET, which is of relevance to the health sector, music and education and (3) the so-called transition system, which consists of various disjointed educational provisions aimed at providing pathways into one of the first two pillars of VET or into the labour market. Despite its shrinking quantitative scope, the dual system still receives the most attention and can be seen as the centrepiece of VET in Germany. Even though it is not the exclusive vocational track, it represents what makes VET in Germany special. One of the particular features is the corporative structure, on which the dual system is based. The basic concepts of this structure are the focus of the following Sect. (15.2.1). In addition to that complementary dimensions of co-operation within this structure are discussed later on (Sect. 15.2.2).

15.2.1 *The Basic Structure of the Dual System*

At first sight, (see Sect. 15.1) the two learning places of school and enterprise are working together, educating young people. This necessarily establishes co-operation, but only in an organisational meaning of building an agenda for the learners to inform them when they are at school and when they are at work. Behind this agenda lies an institutional framework. Schools have to implement a syllabus which, in Germany, is formally established by a Regulation of the Government of a Federal State, for example, Lower Saxony. This is based on the cultural autonomy of the German *Länder* (the federal states) which is based on German Constitutional Law. The result could be 16 different syllabi. The comparability of these state regulations is therefore organised by a supra-regional organisation: the so-called standing conference of the *Ministries for Culture*. There are also regulations regarding the part of the programme which is run by an enterprise. These *training regulations* (*Ausbildungsordnung*) are a centralised Regulation of the federal Government and not of a regional government of one of the *Länder*. Trade unions and employers' organisations together work out the aims, content and organisational framework of the enterprise part of the training programme and develop training *regulations*. This is then legalised by decree of the Federal Government. In summary it can be noted that behind the joint VET-programme of enterprises and schools lies a sophisticated regulation system which, in Germany, depends on regional syllabi for schools and a federal syllabus for enterprises. The programme is a hybrid of compulsory education (the school part) and a private contract (the enterprise part).

As a consequence of this, different stakeholders influence the organisational and curricular framework of the programmes. They are located in an area of tension characterised by educational and economic aims. Thus vocational education claims to foster a twofold development of skills and personality.

Generally speaking, three underlying, independent concepts constitute the field (cf. Kutscha 2000, 5 ff.): (1) the concept of duality, (2) the concept of corporatism and (3) the concept of vocational education (*Beruf*).

These concepts are now discussed in more detail in the following Subsections.

15.2.1.1 **The Concept of Duality**

An apprenticeship in Germany runs on average for between 3 and 3½ years. It consists of two basic parts: (1) Training on-the-job in enterprises and (2) school-based learning in vocational colleges. Trainees spend about 3 or 4 days a week on in-company training and up to 2 days a week at vocational colleges.

Learning processes in training companies focus on learning at the workplace or instruction in company training departments with an emphasis on the practical elements of the training occupation. The vocational college provides general and vocational education for students in one specific vocational field. These students usually have their on-the-job training in different companies within the commuter belt of the school.

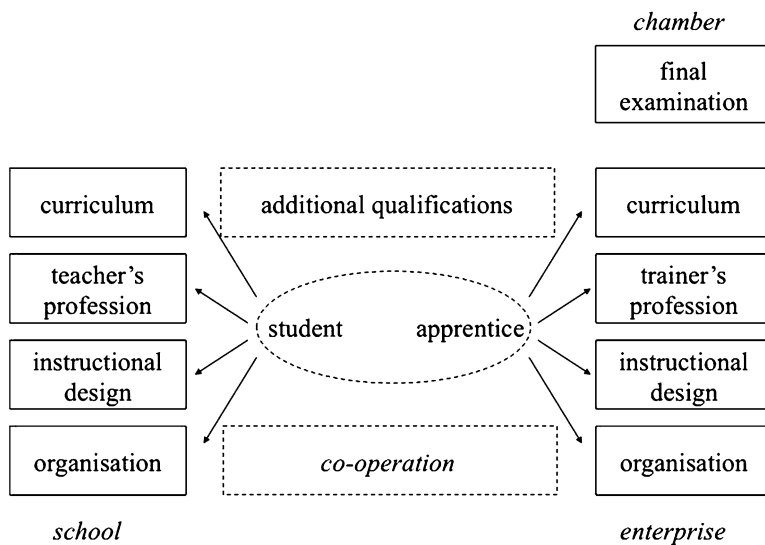


Fig. 15.2 The structure of the dual system

Whereas federal law regulates the former, the latter falls, as already mentioned, under the legislation of the regional Government. Harmonisation processes are in place to integrate both parts of the training and to ensure the comparability of the provision in the 16 *Länder*. The term 'dual' refers primarily to the division of training into two separate learning places, each regulated by its own distinct legislators.

However, the principle of duality goes beyond the division of training into two training venues. The duality of the structure is also reflected in systematic features such as the role and status of training personnel, the funding regime and the supervision of training processes (cf. Ertl 2002; Sloane et al. 2004). That means the attribute of duality goes beyond merely the location of learning. Even teaching and learning processes are shaped by duality, what will be discussed in more detail later (see Sect. 15.2.1.4 and Fig. 15.2).

15.2.1.2 The Concept of Corporatism

The term corporatism describes an institutionalised form of collaboration between governmental bodies, employers' associations, trade unions and other collective actors. This form of policy making is of particular importance to labour-related decisions including collective bargaining and vocational training in Germany (cf. Voelzkow 2009, 461). The negative connotation of this is legalised lobbying. The reverse interpretation is corporatism as a form of participation leading to broad consensus among social groups and greater social stability (cf. Sloane et al. 2004, 218). The dual system is a typical example of this type of governance and therefore, in terms of its regulative structure, may be best described as a state-controlled

market model or Rhineland capitalism (cf. Greinert 2004, Sect. 15.2). Characteristic of this form of capitalism is a state that sets the guidelines for the co-operation of employers and trade unions. Within these guidelines social actors make their own choices. This model is regarded as an efficient way of limiting the risks of ‘market failure’, on the one hand, and ‘state failure’, on the other (cf. Kutscha 1995, 10).

Another important feature in this model is the delegation of regulatory competence for the training system from the government to corporatist bodies. The most important of these bodies are the local, self-governing Chambers of Industry and Commerce, the Crafts Chambers, the Chambers of Agriculture and the Associations of Professions. They have the status of ‘competent bodies’ (*Zuständige Stellen*) and play a crucial role in the organisation, administration and examination of vocational training. More precisely, these bodies act as intermediate organisations between the state and companies and put training laws and regulations into practice. The Chambers have the status of public autonomous agencies that oversee the legal and regulatory norms of vocational education and training within their sphere of responsibility according to the legal guidelines set by the state.

Following the ‘principle of voluntariness’, no employer is obliged to take on trainees. Legally the trainee contract affiliates to private law. However, all firms have to register with a Chamber and those wishing to provide training must be approved by the Chamber as a training company. The approval depends on the equipment and resources of the company, and the qualifications and experience of the trainers working for the company. Furthermore, the local Chamber supervises the organisation and assessment of intermediate and final examinations and acts as an awarding body for vocational qualifications.

Trainees in Germany have a training contract with an enterprise and they have to attend the vocational school, unless they are older than 18 when signing the training contract. In that case they are allowed not to attend school. However, this hardly ever happens, because the shared responsibility of schools and enterprises for vocational education in the dual system is a deeply institutionalised pattern of thought and action that does not require tighter legislation. Having a contract does not mean that the two partners, i.e. the trainee and the enterprise, are allowed to develop their own training programmes. The structure of the training programme is regulated by regional (*Länder*) and federal (*Bund*) laws.

A further example reflecting the principle of corporatism in the training sector is the composition of regulating and executive bodies of the dual system. For instance, supervising and examining bodies are set up by the Chambers and consist of equal numbers of employers’ representatives, employees’ representatives and vocational college teachers. The most important of these bodies at the executive level of the training system are the vocational training committee and the board of examiners.

15.2.1.3 The Concept of Vocational Education (*Berufskonzept*)

The German term *Beruf* can be regarded as broadly untranslatable. Given its original formative context, ‘*Beruf*’ carries the meaning of ‘calling’. After its application

to the world of work in the age of industrialisation, a change of meaning took place. Nowadays neither 'vocation', nor 'profession' is congruent with the German term, but the former is used here because the latter is too closely bound to academic occupations. The idea of vocational education is the already mentioned twofold idea of developing skills and being educated. From this point of view, vocational education and training aims to develop competences and competencies.

Competency refers here to specific capabilities (skills, attitudes) which are useful for the challenges of the workplace. Competence has a generic and holistic meaning referring to a person's capacity, and has a more educational perspective (cf. Eraut 1994, 179). Therefore, vocational education and training in the German tradition is a concept of 'education in and through work'. The individual personality is indeed influenced by working. The concept of vocational education identifies the individual's capability to work and act competently in a vocational environment as the overarching aim of vocational education and training.

Education as part of the learner's personal development has been a constant feature of vocational education in Germany. Further, this concept reflects the need to prepare young people not only for a small number of specific tasks at one company, but to provide a qualification applicable to many employment contexts and responsive to the changing economic and social environments of a whole occupational field. Facilitating a student's personal development is, in most countries, a function of the higher education system. In Germany, this kind of development is also seen as an integral part of vocational education.

15.2.1.4 Didactic View on the Dual Training Approach

The dual system is not only seen as an economic vehicle providing a pathway from school into qualified employment, but also as a didactic approach carried by several social actors. Therefore it is quite useful to describe vocational education and training from a didactic point of view.

In the case of vocational education and training, the German concept of didactics integrates different aspects into one holistic approach²: (1) the organisation (regime) of education, (2) the instructional design, (3) the intentions and the curriculum (syllabus, basic assumptions, main tasks and so on.) of teaching and learning, (4) teachers resp. trainers and (5) learners as subjects of the learning process. Learners in the dual system hold multiple roles: students at a vocational school and apprentice at an enterprise. It is important to note that these aspects are interdependent elements. By further conceptualising them, innovation processes within the dual system can be explained. Furthermore the duality mode of the system becomes visible again. Each of the didactical aspects can be worked out school-based and enterprise-based. In addition to these basic elements also (6) additional qualifications and

²*Didactic* is not an approach just referring to vocational education and training. It is a general mindset for learning and teaching perspectives in various socio-economic living environments as well as the aims of these processes and mechanisms to regulate instructions.

(7) final examinations are discussed in more detail. All of these didactical aspects respective institutional elements also reflect the core topic of this chapter: the need for vertical and horizontal co-operation on different levels. Figure 15.2 offers an illustration of all these elements.

In the following all these illustrated elements are specified:

(1) *Organisation*

Vocational colleges and enterprises are educational *organisations* within an institutionalised field. In economic theory, *institutions* were defined as humanly devised formal and informal rules that shape human interaction (cf. e.g. North 1990, 3–5). The terms ‘institutions’ and ‘organisations’ can therefore not be equalised. Organisations are social entities that establish boundaries to determine members and non-members, whereas institutions may be the cause of an organisation, define the relationships of the organisation with other social actors and establish a basic set of rules for the interaction within the organisation that is shaped by the organisational/corporate culture. Thereby institutions determine the way in which work challenges enter teaching and training contexts. As we have seen, the principle of corporatism is at the heart of the institutional framework of the German training system and provides the social partners with a high degree of influence. Schools and training institutions interpret the guidelines set out by the authorities and social partners and decide on the ways in which they react to the changing challenges from the world of work. As will be shown below, educational organisations can be part of variable living environments, which are, among other things, established by distinct causes. Schools are established for educational purposes and enterprises for maximising profit. However, within the German VET system, beyond maximising profit, enterprises also fulfill an educational purpose.

(2) *Instructional designs*

Instructions are not only techniques and methods teachers and trainers use to enhance the trainees’ learning processes. Instead, the *instructional design* is a complete learning and teaching approach referring to learning theories and cognitive strategies of learners, on one hand, and the intervention strategies of teachers and trainers on the other. These approaches are worked out in rather sophisticated programmes such as case studies, projects, research-based learning and problem-based learning.

Education of those, who do this work and research on this type of VET is performed by university units for Business Education. Further research is done by public and private funded research institutes. Whereby two different styles of research can be distinguished: a psychology-based empirical program, which focus on testing instructions in a stable context and on verifying competence levels (cf. e.g. Achtenhagen and John 1992) on the one hand and a design-based research program, which focus on the development of prototypes for specific contexts together with field actors on the other hand (Euler and Sloane 1998). Considering the context of applying didactical theory is of importance also, because quantitative empirical test designs show that the variance of instructions in different settings, which were all

designed based on a generic didactical concept may be larger, than the mean variance of instructions in a number of test settings based on alternative didactical concepts (cf. Euler 2011, 529). This can be explained by the “quality” with which didactical instructions are developed and used (cf. Nickolaus 2010, 57). Based on that, Achtenhagen and John (1992) argue that there is consensus among experts that complex learning-teaching-arrangements are a concept that attempts to respond to wider social and economic megatrends within the field of vocational education and training.

(3) *Curricula*

Curricula set the standard for the knowledge and skills regarded as relevant by the institutional actors and enterprises and schools have their own forms of them. Curricula include documents such as training plans and lesson plans. There are different ways to formulate the challenges of the world of work in curricula: they might be outcome-oriented (describing the tasks trainees should be able to perform) or input-oriented (describing the way in which the training processes should be conducted). In Germany, curricula were traditionally expressed in terms of inputs such as teachers’ and trainers’ qualifications, class contact hours and training contents (Koch and Reuling 1998). However, the last one and a half decades have seen a sweeping shift towards outcome-oriented curricula. In this shift ‘learning areas’³ for the schooling part were introduced and a large number of enterprise-related curricula were rewritten. For the years 1996–2012 that applies to more than 300 curricula for enterprise-based VET (*training regulations*) and more than 250 curricula for school-based VET (cf. KMK 2013). Usually the processes for the development of enterprise- and school-based curricula referring to the same qualification are synchronized. Nevertheless, the curricula of schools and enterprises remain in distinct legislative regimes, which influences the transfer processes between the world of work and the school-based training contexts. Furthermore during the shift to learning outcome also new curricular formats were introduced such as educational standards (cf. Ertl 2006) and qualifications frameworks (cf. Sloane 2008).

Returning to the case of the dual system, a situation with only loosely-coupled curricula, it can be argued from a more theoretical perspective, that increased opportunities for learners to integrate their developing academic and work knowledge have to be provided, as they develop their learning/work identities through repeated episodes of ‘boundary crossing’ between school and work (Griffiths and Guile 2001). The type of curricular options available to link these worlds will be discussed later on in this paper (Sects. 15.3.3, 15.3.4, and 15.3.5).

(4) *The teachers’ and trainers’ profession*

Pedagogic staff in schools and enterprises are characterised by distinct recruiting and education processes. While teachers receive their education at universities and develop a pedagogical self-image, trainers are promoted within the company after

³For more on curricula based on *learning areas*, see Sect. 15.3.4.

professional experience. Their pedagogical qualifications are often quite limited, even though a relatively weak legal minimum standard is in place (*German Trainer Qualifications Act*, AEVO). To this end, teachers and trainers translate the contents and aims set out in their respective curricula into teaching and learning situations on a day-to-day basis. In addition, they are sometimes part of the institutional framework, since they assume roles in school administration and curricula commissions. The way in which they fulfil these functions depends on their qualifications and their interpretations of their professional role. The degree to which teachers have contact with the world of work varies; some of them might consider this contact as less important than pedagogical skills and knowledge.

(5) *The Learners: students and apprentices*

Learners in the dual system are integrated into two different learning places. As has been said before they are working up to 4 days a week at their respective enterprise and up to 2 days a week they go to school. The roles and expectations in these two roles differ a lot. At their enterprises the learners are also expected to contribute to the value adding process. Especially small handicraft enterprises depend on the work of apprentices, who receive compensation in form of collectively negotiated wages below the level of skilled workers or employees. When theories, values or practices taught at school and enterprises are not consistent with one another, learners have to decide to which concepts they align their actions. More often than not the enterprise side proves to have the greater power of persuasion. However the theoretical knowledge that is offered at school is usual considered crucial to pass the exam for the enterprise-part of the qualification. This exam is owned by enterprise representatives, but includes so called practical and theoretical parts (for more on theory and practice see Sect. 15.3.1).

(6) *Additional Qualifications*

Additional Qualifications are supplementary programmes to the institutionalized and closed vocational profiles, for example courses in entrepreneurship, intercultural communication, foreign languages and so on. These are offered by schools and enterprise organisations (cf. Braukmann and Sloane 1997). They are outside the formal regulations and are seen as a possibility to individualise the apprenticeship programme and offer further flexibility. They are often established on the basis of Chamber provision. In a study of about 6,000 apprentices 65 % say it is important or very important for them to gain additional qualifications (Gei and Stertz 2010, 3). This reflects the need for individualizing the standardised profiles of the dual system.

(7) *Final examinations*

The regulation of the *final examinations* for the dual system is completely controlled by the enterprises. *De jure* the schools have their own examinations, which are *de facto* of minor relevance. The most significant final examination should reflect the instructional design, on the one hand, and the curriculum on the other. In this case it would be possible to evaluate how well the training programmes

work. However, in fact there is a huge distinction between the work in the enterprises and vocational colleges and the examination bodies (chambers, collectively representing enterprises). This predetermines the pedagogical work in the training programmes. The final examination has the quality of a *'hidden curriculum'* because the teachers often have to organise their work referring to the examination structure of the enterprises in the dual system and not referring to the basic syllabus of the schools. Ongoing research on this type of examinations shows that the intended competence profiles may not be validated by the exercises currently used. For example it can be shown that domain-specific and cross-domain knowledge is not tested separately, thereby allowing apprentices with prior experience advantages in the test design that go beyond their actual (latent) knowledge (cf. Winther 2011). Regardless of these challenges, the final examinations for a vocational profile within the dual system proves to be of great quantitative importance. About 750,000 apprentices pass their vocational exams each year compared to just about 360,000 graduates of higher education institutions (cf. Destatis 2012, 82).

Having considered these seven elements of the dual system, which also specify fundamental differences between the learning settings, it is now necessary to consider in the next section how co-operation between enterprises and schools may still get in place.

15.2.2 The Co-operation Between Enterprises and Schools

The co-operation between the distinct learning places 'enterprise' and 'school' might be considered to be the centerpiece of the dual system. However, as shown earlier, separate forms of legislation, curricula for job-based-learning and colleges as well as a disparate institutional logic emphasise the separation of both settings, rather than the dual sides of a shared learning process or objective. To show how the co-operation between both learning places can be organised, the current state shall be discussed.

Co-operation between enterprises and schools within the dual system addresses, on the one hand, the didactical quality of learning and teaching and, on the other hand, institutional questions. Institutional questions are relevant when it comes to the organisational infrastructure and co-determination in political decision-making.

Institutional order and didactical-organisational implementation are two sides of the same coin that represents co-operation:

- the didactical dimension of the dual system: the combination of generalised (systematic) learning arrangements in schools and case-based learning in enterprises. The didactical perspective considers the matching of both forms of learning and/or teaching;
- the institutional dimension of the dual system: this includes the political organisation of the participation network of governmental bodies, trade unions and employers' representatives regulating the dual system. This neo-corporatistic

governance system applies explicitly to the enterprises, but *de facto* also impacts on the schools. This institutional order leads to a further distinct German feature: the funding of apprenticeships predominantly by enterprises (totalling about 25 billion € per year, BIBB 2009, 229). However a further study reveals that average training costs per apprentice per year of 15,288.00 € are reduced by an average income per apprentice of 11,692.00 € to net costs of only 3,596.00 € (cf. BIBB 2009, 233). However the high stake of enterprises in the funding of the whole system is unchallenged.

When the importance of VET in Germany for the integration of a large share of a cohort into the labour market and for the economy is in question, both sides of the coin have to be considered. Even though the didactic dimension serves as the focal point of the discussion in this chapter, the institutional side remains complementary. This bilateral composition is already visible in the contractual form. Trainees are, through their trainee contract, which is a type of employment contract, part of the enterprise and thereby part of the economic system. Then again this economic system constitutes a complex learning environment for them, which the trainees unlock through an individual learning process. Furthermore, trainees have a second role as students in a vocational school, which is a part of the schooling or educational system.

Alternating roles, learning places and institutionalised systems raise the issue of relating educational and economic systems. School and enterprises are seen as sub-systems of these parent systems with distinct rationalities (cf. Stratenwerth 1959, 812; Pätzold 1997, 126 f.). In order to harmonise school-based and enterprise-based learning, a reference to a “higher standard” (cf. Euler 1999a, 6, translation by the current author; Euler 1999b, 249) must be established. A point of reference for such a higher standard can be the didactical design of transfer options, which are characteristic of a system in which two learning places are involved.

With regard to co-operation two different forms of alignment between schools and enterprises are possible:

- 1st The School precedes Enterprise
- 2nd The School follows the Enterprise

(1) School precedes Enterprise

This is, for the most part, the standard case in the dual system. In recent decades schools have had some kind of hidden leadership in organising the instructional design of the dual programmes. This becomes clearer when the training contracts are taken into consideration. In 2009 approximately 560,000 contracts for a training programme were concluded by 493,000 enterprises.⁴ These simple figures already show that enterprises participating in the programme have, on average, only one apprenticeship per year. The school part of these apprenticeships is organised by 8,800 schools.⁵ In the standard case in a school class for, for example, industrial

⁴Figures from: BIBB 2009, 111, 172.

⁵Figures from: DESTATIS 2012, 86.

clerks, 30 students study in one class and work in between 25 and 30 different enterprises.

This makes the schools and the teachers the hidden organisers of the programme. On a day-to-day basis teachers have to organise the co-operation with the enterprises.

This is often managed at an instructional level. Approaches are:

- Teachers present theories and concepts and give the students advice regarding how to experience them in the enterprise. This can, in some cases, cause problems if the enterprises perceive this as interference in their work. This is the process from knowing to doing.
- Teachers ask students, for example, to summarise this and develop some of the theoretical backgrounds of these examples. This approach, from doing to knowing, can also have certain difficulties as it is necessary that the students access practical experience in their enterprise work (for illustrations see Sect. 15.3.3 ff.).

These two examples already show that the co-operation can be regulated by two instruments: it can be established in the curricula of enterprises and schools to organise a convergence of practical experience and school-based learning. It can also be managed by some kind of collusion between trainers and teachers. In both cases we have to keep the figures in mind: 560,000 contracts: 30 students, 30 enterprises and one class with one or two teachers respectively. The discussion of this aspect of co-operation will be continued later (see Sect. 15.3.4).

2. School follows enterprise

This approach is typical of some in-house classes in large enterprises. In Germany firms such as Siemens have the possibility to make arrangements with single vocational schools. In these – in this case so-called – Siemens classes they can then have, of course, special arrangements with the school. This makes it possible to have problems and cases in the enterprise as a starting point for instructional arrangements. The learning starts in the enterprise and students are sent by their trainers in the enterprise to the school with the task to find relevant knowledge to solve the problem. Teachers at school are then in a position to offer theories and concepts for real-life problems. This is an ideal approach to de-contextualising practical problems, providing theoretical background and forcing students to contextualise this knowledge in the enterprise surrounding. In Sect. 15.3.3 this will be analysed more deeply.

This approach needs far more than reconciliation at the level of the curriculum or some kind of exchange of information between teachers and trainers. In this particular case trainers and teachers have to develop a joint approach. This is of course a far deeper co-operation (see Sect. 15.3.2 for various levels of co-operation).

In the light of the above assessment the following preliminary conclusion can be drawn: From a naïve perspective on vocational education the daily work on training and teaching in schools and enterprises can be seen as two different learning surroundings. The interesting question then is whether there are any systematic pathways between these learning places which the students or the apprentices, respectively, can take in order to develop useful competences.

This discussion leads to institutional, organisational and curricular backgrounds of vocational education. The above discussion shows these backgrounds for the German case. A rather complex system of rules and levels of co-operation has been illustrated. At the end, two rather naïve approaches, and deliberately so, have been stated: A pathway from school to enterprise and one from enterprise to school. In summary the normal case according to the real conditions of the majority of apprenticeships is an organisation of the co-operation between school and enterprises by the schools.

In the following section this naïve position will be theorised again through applying some exemplary research results to different aspects of this co-operation between schools and enterprises.

15.3 Theoretical Approaches Towards Co-operation in Vocational Education and Training (VET)

In this section the following theoretical issues associated with understanding and evaluating co-operation will be discussed:

- 1st Co-operation versus incommensurability of learning places
- 2nd The Ladder-Model of co-operation in VET
- 3rd ‘Running into practice’ – sophisticated approaches towards co-operation in VET
- 4th The ‘*Lernfeldkonzept*’ – realistic approaches towards co-operation in VET
- 5th Integrated apprenticeship – a visionary approach towards VET

Regarding the purpose of this chapter it is useful to note, that these conclusions from practices within the dual system in Germany, provide vantage points and pathways for the development of professional education.

15.3.1 Co-operation Versus Incommensurability⁶

Despite the vast potential for such distinctive didactical considerations, the logic of co-operation in the dual system is determined by the institutional order. This leads to routinised practices at the political and administrative level, where curricula are developed, whereas at the didactical level (i.e. learning places at schools and enterprises), co-operation remains random and casual. Therefore it falls to the trainees to connect the dots of fragmentary, inconsistent and unrelated experiences in enterprises and schools (cf. Euler 1999a, 13). Consequently, the didactical model of the dual system has to be challenged. The idea of a joint curriculum (*Gleichlauf-Curriculum*, cf.

⁶This subsection is based on the experiences in the research-programme WisLok which was founded by the Federal Minister for Research and Science (cf. HELP 2001; Dilger et al. 2001).

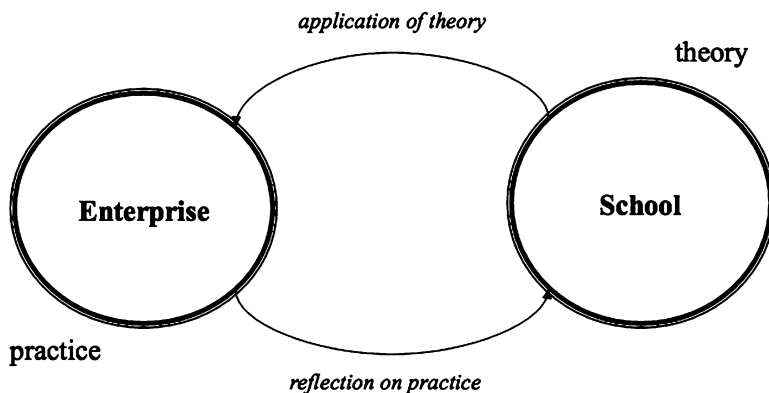


Fig. 15.3 Synchronization of theory and practice within the dual system – the traditional idea of joint curricula

Lipsmeier 1987, 57), which parallelises theory, provided by the school, and practice, provided by the enterprise, is considered obsolete (cf. Euler 1999a, 7; Kremer and Sloane 2001, 11 ff.; see Fig. 15.3).

Rather, theory and practice cannot be allocated to just one learning place, but must likewise be integrated in learning settings at both the enterprise and the school (cf. Kaiser 1994). This premise leads to schools creating space for practical experience (simulations, tutorials, junior firms, cases) and to enterprises providing theory (classrooms, e-learning tools). In fact, this not only happens at a conceptual level, but is also cognitive and tangible. Hence, the inherited theory-practice-model of the dual system is not viable any longer (cf. Kremer and Sloane 2001, 12; Tuomi-Gröhn and Engeström 2003).

Following this argumentation, designing transfer processes is not about allocating theory to schools and practice to enterprises and drawing on this ‘good’ matching of theory and practice. Instead the suggestion is made to see schools and enterprises as two incommensurable living environments, of which the matching has to be organised. Even though both living environments are constituted by distinct rationalities and institutional backgrounds, they each share a theory and a practice dimension (see Fig. 15.4). Linking theoretical knowledge and everyday experiences (cf. Pätzold 1997, 128) becomes a challenge within schools as well as within enterprises. In both living environments, the learners are confronted with distinct instructions, which demand actions consisting of both a theoretical and a practical perspective (cf. the findings at the symposium on ‘dual system caught between tradition and innovation’ in Twardy 1991). Thus, co-operation in professional education is not the matching of enterprise as the practical learning place and school as the theoretical learning place, but the matching of two distinct living environments, each deploying a practical and theoretical dimension. Both living environments provide distinct learning options. Therefore the suggestion is made to see co-operation as a combination of instructions in dual living environments which have to be organised taking into account the didactic and institutional dimensions.

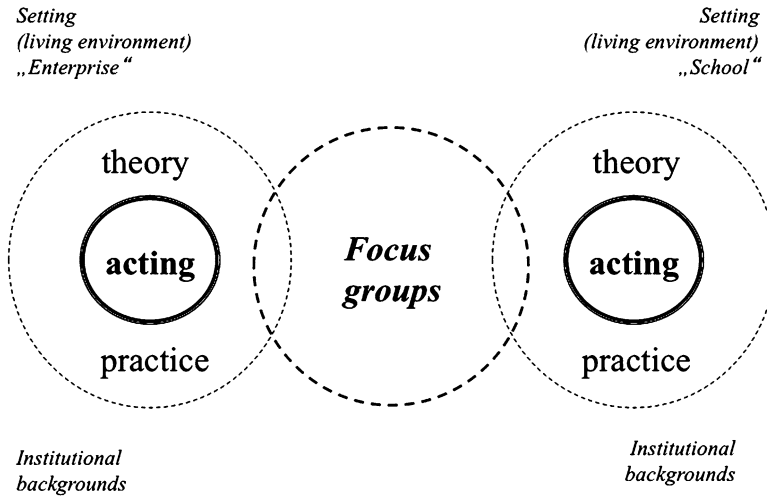


Fig. 15.4 The dual system as a matching process of distinct living environments

Furthermore, it is worth noting that the school carries out the lion's share of the organisational tasks within this co-operation. This specific form of task assignment is not formally codified anywhere and is in conflict with the formal statement of emancipated learning places. However, allocating the burden of managing two incommensurable living environments to the school is the result of routinised practices that have been going on for decades.

Even in a context where co-operation is needed, enterprises and schools sustain their own logic and institutionalised identities. Given this type of situation it is best to speak of co-operation in the dual system as loosely-coupled (cf. Weick 1976) entities.

15.3.2 *The Ladder-Model of Co-operation in VET*

In the discussion on co-operation the intensity of collaboration has been differentiated. Euler (1999a, 7) and Buschfeld and Euler (1993, 26ff) differentiate the intensity of co-operation according to mutual information, mutual matching and collaboration. Given that there is a basic demand for mutual information processes between the school and the enterprise, and given that co-operation is analysed in the context of the concept of learning areas (see Sect. 15.3.4), five levels can be distinguished: beyond merely informing one another, co-ordination, temporary co-operation, long-term co-operation and team-based partnership can be discerned (see Fig. 15.5). The continuum ranges from a relatively loose and unconnected co-existence to a didactic-based rehearsed collaboration. Scaling these different levels tends to be very difficult for the actors involved. Design-based research projects

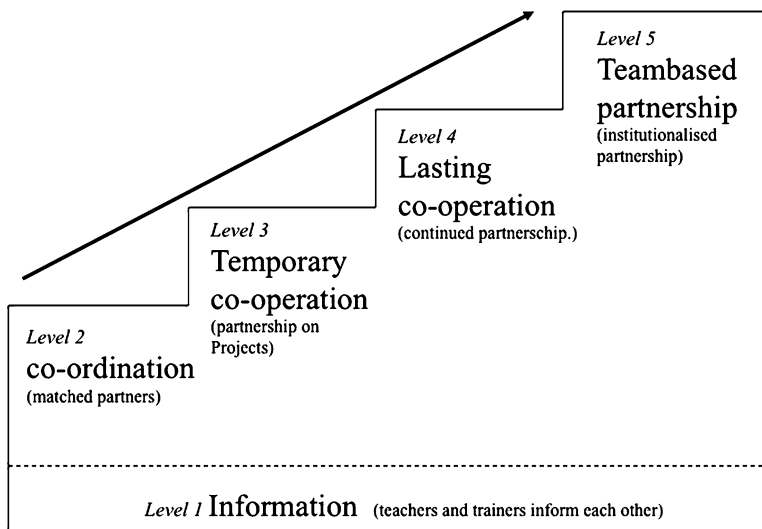


Fig. 15.5 Intensity of co-operation

show that a moderating voice is needed at least to introduce these processes and to have ownership of some procedures (cf. Diesner et al. 2004).

The examples in Sect. 15.2 on the two sequences (1) from school to enterprise and (2) from enterprise to school can be put into these classifications. The ‘normal’ school-to-enterprise co-operation is one on level 2. Based on level 1 (information) co-ordination between schools and enterprises is necessary. The enterprise-driven approach is at least at level 3. It is a partnership project.

15.3.3 ‘Running into Practice’ – Sophisticated Approaches Towards Co-operation in VET⁷

As mentioned in Sect. 15.2, learning between the two learning places is often organised as a ‘shift’ from the school to the enterprise: At school, the subject knowledge and heuristic strategies are developed. It is then up to the students to apply this knowledge to practical problems. As there is no real matching between enterprise work and school learning (see Sect. 15.3.1), this often leads to declarative knowledge and non-contextualised knowledge.

Thus, it is to some extent a deductive approach with the following problems:

- 1st The students already have to have some kind of sensitivity towards practical problems. If they do not have this ability they simply do not know why they are

⁷This chapter is based on results from the project, FäLou’ which was funded by the German Research foundation (cf. Sloane 2004).

learning specific subjects in school. Teachers often do not achieve this properly and may believe that theories are self-explanatory. Teachers have to understand that this knowledge has to be situated in a working context.

2nd The knowledge students gain at school cannot automatically be used by the students in their working context to understand the working context. In contrast, in the enterprise a ‘working language’ is often used which differs with regard to concepts and rules to the theoretical knowledge offered at school. This is not only a matter of vocabulary. There is quite a difference between practical (vocational) knowledge and theoretical knowledge.⁸

3rd Nevertheless, there is a gap between the tacit knowledge of the students and the knowledge students gain at school. In daily life they decide on the basis of tacit knowledge.

In the research and development-project ‘FäLou’ a ‘context change’ was organised. This change refers to a student’s movement between the school and the enterprise. The central idea is that the contexts in enterprise and school fit together, and thus the students have to solve tasks in both learning places which match each other. The ‘scenery change’ is a joint learning arrangement of participating enterprises and a school. A focus group established by trainers of participating enterprises, teachers of the school and a research group developed this arrangement. This group-based work is an example of a co-operation at level 3 or 4 according to Fig. 15.5. It took nearly 2 years for the group to find a common basis for their work. During this time it was necessary to establish joint ideas on education, learning and so on.

After this establishing phase the focus group developed an arrangement for *cost structure analyses*. This concept is used to find out if the increasing prices of suppliers are justified. Normally, this analysis can be proved with a benchmark of prices of different suppliers simply by comparing competing offers. Now, the cost structure analysis is used for the case where there are no other comparable suppliers on the market. Then statistical approaches have to be applied to analyse the general development of costs in particular market segments. This is a practical task where theoretical knowledge can be applied.

In this arrangement the students have to manage three tasks. First, they have to assess a particular offer made to the enterprise. To do this they have to learn different statistical approaches and then apply these techniques to a report on cost development. This was done in school. Secondly, they had to write a refusal of the offer which was again part of the enterprise work. In this refusal they were supposed to mention some reasonable grounds. Thus the supplier understood the argument and had the possibility to upgrade respectively to correct their offer because the enterprise wanted to continue the business relationship with them. Finally, the students summarised the experience at school.

⁸This is of course also a matter of the different curricula as schools in Germany traditionally have research or science based syllabi during training profiles that are driven by practical problems. See also Sect. 15.3.4.

It can be seen that this is a sequence enterprise-school-enterprise-school with different foci: Starting with orientation in the enterprise where the problem is worked out, the students go to school to gain knowledge to deal with the problem. Then the students have certain experiences in applying the knowledge in a working environment. These have to be generalised. Figure 15.6 illustrates the design of the arrangement:

The effects of this arrangement were documented by comparing the pre-knowledge and post-knowledge structures of the trainees (cf. Sloane 2004, 148f). For the specific argumentation here these effects are not the main point of interest. Here, it is important to point out the working process of developing this type of joint arrangements between schools and enterprises. It has to be seen that this is a long on-going process of co-operation which leads, according to the ladder-model, to co-operation at level 4. The actors establish a continuous programme of developing tasks together.

However, a final point must be made: This kind of co-operation only works and stays stable when somebody organises it. There is a high degree of instability, especially at the enterprises. The actors change, the enterprises re-organise, change their priorities and so on. The schools are relatively stable, but have to deal with the changing modes of the enterprise's actors.

Nevertheless, this can be used as a sophisticated approach which could be possible in a good working co-operation. Coming back to real-life settings in daily work in vocational schools it has to be asked how and to what extent this example can be transferred. A realistic view is necessary.

15.3.4 *The 'Lernfeldkonzept' – Realistic Approaches Towards Co-operation in VET*⁹

Arguably the most important step of reform in the current crisis has been the so-called '*Lernfeldkonzept*'. The term *Lernfelder* can be roughly translated as 'areas of learning' or '*learning area*', which form the basic unit of newly developed curricula for the school part of the dual system. The concept was introduced formally by a decision of the Conference of Education Ministers (*Kultusministerkonferenz*) in 1998 and revised in 2012 (cf. Dilger and Sloane 2013). It applies the notions of didactic innovations, such as activity-oriented and comprehensive learning, to the context of vocational colleges.

The main idea of this concept is the reconstruction and/or simulation of vocational processes at vocational colleges. Tasks and activities the trainees are typically confronted with in training companies ('working area') are the basis for the

⁹This chapter is based on a number of research projects (NELE, segel-bs, mosel) completed for the Federal Minister of Research and Science and the Ministries of Culture in Bavaria, Hessen and North-Rhine Westfalia between 1999 and 2009. The outline of this chapter was first published by Hubert Ertl and the current author (Ertl and Sloane 2004; see further Sloane 2004).

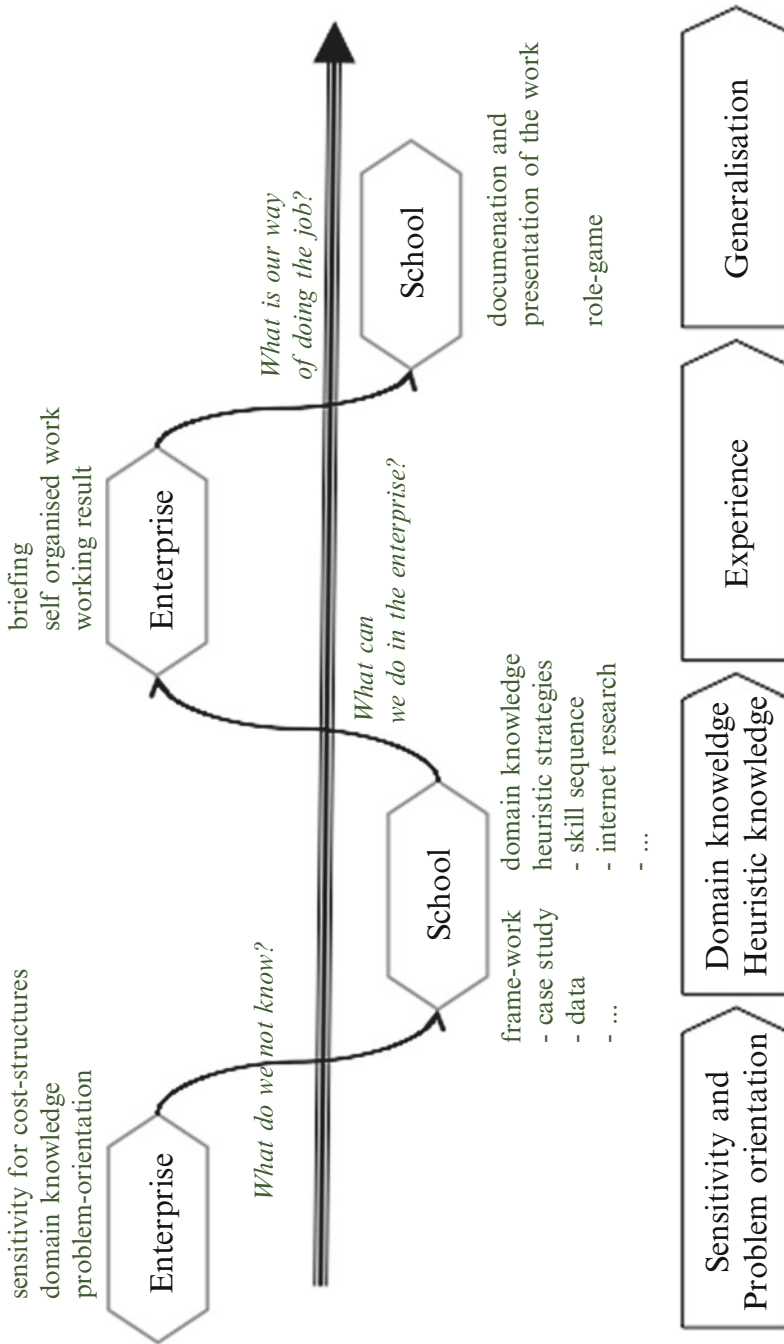


Fig. 15.6 The movement between learning places as a context change

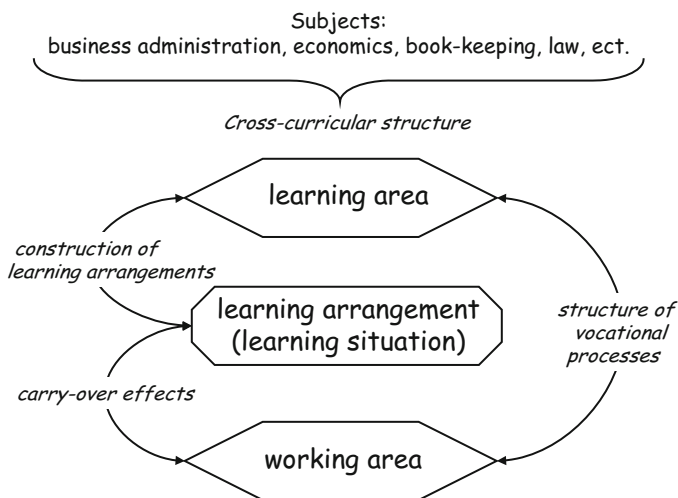


Fig. 15.7 Connection between areas of learning and work contexts

construction of ‘learning arrangements’ (learning situations at vocational colleges) that constitute an area of learning (Sloane 2001). Learning areas also draw on the knowledge that is represented in conventional school subjects. However, the traditional subjects are transformed into a cross-curricular structure in which comprehensive tasks have to be completed and real-life problems have to be solved by the trainees. Put in a nutshell, learning areas represent pedagogically adapted and enriched vocational processes derived from actual work contexts (Kremer and Sloane 2000, 73). The connection between learning and working areas and the way in which learning arrangements are constructed is illustrated in Fig. 15.7.

There are a number of conditions for the successful implementation of the concept of learning areas. These conditions and the resulting changes in the set-up of college-based training provisions have an impact on the three transfer elements conceptualised earlier. The changes outlined in the following illustrate the interdependence of the transfer elements.

First and foremost, the ‘*Lernfeldkonzept*’ is a *curricular* reform. Whereas curricula for vocational colleges used to be strongly prescriptive in terms of content, aims and time allocated to content and aims, curricula developed on the basis of the concept of areas of learning are formulated in an open way. The processes of curriculum construction are transferred from the state level to the level of individual colleges. This means that actors at the political level, who assumed the responsibility of developing the prescriptive curricula in the past, now only set broad guidelines for the teaching at vocational colleges. On the basis of these guidelines workable aims and operational contents for teaching are developed at the level of the individual colleges.

This means that the work and the role of *teachers* at vocational colleges have changed. The translation of curricula into instructional designs has become part of

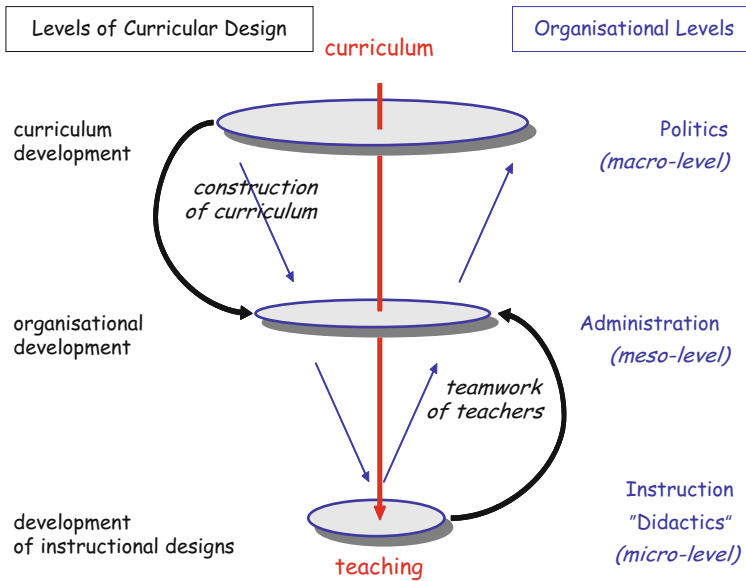


Fig. 15.8 Curricular and organisational changes in the 'Lernfeldkonzept'

the work of teachers. This task can only be fulfilled through close the co-operation of the teaching staff, which has consequences for the *organisation* of vocational colleges. For instance, teachers have to co-operate as a team in order to develop schedules and lesson plans on the basis of the curricular guidelines.

In summary, the responsibilities of the teachers increase and the tasks they are asked to fulfil become more complex. These are typical indicators of a changing notion of *professionalism* of teachers and of job enrichment. Also, the organisation of colleges has to change to initiate and support the teamwork of teachers. This change is part of a wider reshuffling of responsibilities in the institutional set-up of vocational training. The changes are illustrated in the following figure (Fig. 15.8).

In order to be able to plan teaching and learning processes on the basis of vague curricular guidelines, teachers have to take real-life work contexts into account. As hinted at in the previous section, learning areas represent pedagogically adapted and enriched vocational processes derived from actual work contexts. This means that teachers have to co-operate with training companies while planning their lessons. The long-standing organisational and pedagogical challenge of co-operation between the two main venues of training in the dual system has become more pressing than ever (cf. research documented in Euler, 1999a, b). Keeping in touch with developments in the economy and establishing contact with training companies becomes a central task for vocational colleges and teachers.

15.3.5 Integrated Apprenticeship – A Visionary Approach in VET

As enterprises and vocational schools in Germany are embedded in different institutional settings, co-operation is an organisational reaction to arrange pathways between these two learning places. Dual system indeed does not mean that there is one system with two sides, but rather it correctly implies two systems which have to co-operate.

There have been many discussions in Germany about whether it is possible to establish more access between enterprises and schools by introducing requirements. However, in the end the gap between the two learning places is too wide. As mentioned in Sect. 15.3.2, enterprises and schools are part of two distinctive, even incommensurable life settings.

Nevertheless, at least one of the more visionary approaches should be mentioned. It is an integrated approach towards VET which is found in the area of social and medical services. Medical and social institutes run this kind of concept. Here schools and enterprises are often in one system. In other words: there is no institutional gap.

Similar experiences can be found in new vocational programmes, and joint programmes of enterprises and universities of applied sciences should be mentioned in particular. In all these cases there is an integrated curriculum for the enterprise part as well as the school part of the programme. Thus, an ideal co-operation can be established which strictly follows the idea of an institutionalised partnership programme according to level 5 of the co-operation ladder (see Fig. 15.5).

Figure 15.9 illustrates the main ideas of such a sophisticated approach. It generalises the concept in so far as it adopts the principal aspects of the dual system. In this approach the regulations of the school and the enterprise are linked together on the basis of generalised action fields. This is adopted from the '*Lernfeldkonzept*'. If the regulations for the enterprises (training regulations) and for the schools (framework syllabus) were both based on a uniform framework of action fields this could lead to more coherence between the two learning places. Action fields are typical qualifications, but they could also be defined as competences. The school-based learning tasks and the enterprise-based working tasks could be co-ordinated.

This would then possibly lead to a sequence of learning phases in the school and in the enterprise (like in Fig. 15.6). Nevertheless, a co-operation between teachers and trainers would be necessary. Teachers and trainers would still have to generate tasks resp. instructions, which foster the learners to apply knowledge to diverse situations, let them be work processes or learning situations. Both, work processes and learning situations, can be designed by shared didactical principles. If these learning units are to sequenced beyond the border of an enterprise or a school, then teacher and trainers need to have common ground for their didactical decisions. Generalized action fields that serve as a basis for training regulations (enterprises) and framework syllabus (schools) could be used to come to common understanding about didactical co-operation (Fig. 15.9).

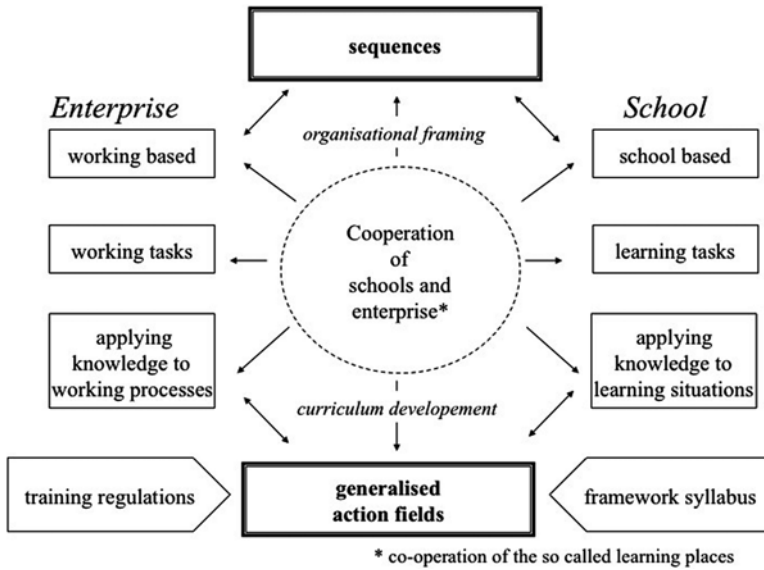


Fig. 15.9 The integrated approach towards VET

15.4 Final Remarks: Behind the Curtain

Finally it is important to examine the discussion of vocational education and training and the emphases made with regard to the dual system. In Germany there is an on-going discussion about the success of this system and a strong belief that this approach should be transferred to other countries. Every once in a while excited statements are made in the media that another country wants to adopt the system. Sometime later the excitement calms down and the country is not further mentioned until a new aspirant is located. In the end the dual system is and remains a German approach and it does not seem to be transferable.

This has something to do with the different layers, which were discussed in this chapter and has to be reflected in the ambivalence of naïve examples, on the one hand, and the also discussed complex framework, which constitutes the dual system, on the other. This framework brings three aspects together: didactics, governance and organisation.

When practitioners or politicians look at the dual system they refer to the organisation between enterprises and schools. They often do not understand that it works on the basis of a German governance approach. That vocational education is, for example, an educational and not an economic model seems to elude them. Something similar, by the way, happens if German politicians reflect on the system. They always point out that the enterprises do sterling work in offering apprenticeships.

That is, of course, a basic decision. By doing this they offer to take on costs for education which in other countries are paid for by the government. However, it

should be mentioned that in a 3-year programme apprentices bring in more profit than they cost after 2 years. The enterprises break even at that point at the latest.

Enterprises and schools co-ordinated to some extent, even if the enterprises and schools are in some particular way incommensurable to each other. That has something to do with the role of vocational colleges, or schools, respectively. In the German perception the enterprises guarantee the success. However, all the experiences mentioned in this contribution show that most of the work is done by the schools. Good co-operation and success in final examinations is always the result of schoolwork.

Therefore it seems useful to think more about the functions of schools in co-operative systems where enterprises and schools work together. This is a matter of how schools apply their work to practical life. Teachers in vocational schools have some kind of external reference because they have to find some pathways into practice. The correct reason for the success of dual apprenticeship, therefore, is not the simple fact of participation of schools and enterprises, but the sophisticated possibilities of linking school work to the practical problems of daily life in enterprises.

To realise these opportunities a specific type of teacher is required who is able to organise co-operation using a didactic approach. Finally, the dual system may seem to be spectacular, but behind the curtain there are hard-working and well-educated teachers doing their work.

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Chapter 16

The Dual System of Vocational Education and Training in Germany – What Can Be Learnt About Education for (Other) Professions

Bärbel Fürstenau, Matthias Pilz, and Philipp Gonon

Abstract The dual system of vocational education and training (VET) in Germany is a specific training system that aims at systematically combining the advantages of training in a company and education in a vocational school. Germany's dual system is expected to strongly support a successful transition of young people from school to work and to guarantee a skilled workforce as a prerequisite for a successful economy. In addition it plays a role in educating young people. The central goal of VET in the dual system is to help students attain and develop competence in action so that they can meet current and future professional challenges and participate in defining their vocational lives. Because of on-going changes in society, economy and at the workplaces, the dual system has been under pressure of adaptation in order to further maintain its effectiveness and efficacy. Consequently, especially since the 1980s, many adjustment processes have taken place on different levels of the system, namely the institutions involved, the syllabi for the different venues, and the teaching-learning processes. The article will explain the dual system as well as highlight and comment on the different endeavours for its modernisation. It focuses on parity of esteem between general and vocational education and between different forms of vocational education. Furthermore it takes into account cost and benefit of in-company training, modularisation of training occupations, and the relationship between learning and working. As a result, it will give some advice on what can be learnt about education for professions.

Keywords Vocational education and training • Dual system • Education for professions

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16.1 Outline

Dual systems of vocational education and training (VET) are specific training systems that aim at systematically combining the advantages of training in a company and education in a vocational school. Dual systems in this form do exist to a considerable extent in Germany, Austria, Luxemburg, Switzerland, Denmark, and parts of the Netherlands. German-speaking regions of France and Italy also (often) fit into this framework. This article focuses on the dual system of VET in Germany (hereafter only referred to as “dual system”).

Germany’s dual system is expected to strongly support a successful transition of young people from school to work and to guarantee a skilled workforce as a prerequisite for a successful economy. In addition it plays a role in educating young people. Consequently, the central goal of VET in the dual system is to help students attain and develop competence in action so that they can meet current and future professional challenges and participate in defining their vocational lives.

In order to meet this challenge and in order to further maintain its effectiveness and efficacy, especially since the 1980s, many adjustment measures have been implemented. Reasons for the adjustment measures can be seen – besides others – in the demographic development, shift from industrial to service economy, or changes of workplaces and demands for the workforce. The demographic development has led to a drop in the demand for training places and thus to problems of recruiting a skilled workforce. The shift from industrial to service economy has required an increase in apprenticeships in the service sector and more service orientation of apprenticeships in other sectors of the economy. Workplaces have become more complex and require more intellectual skills such as systems thinking, and they require continuous learning. The measures taken refer to different levels of the dual system, namely the institutions involved (companies in the private sector, vocational schools, employers and employees, the Federal Government, the German states etc.), the syllabi for the learning venues (schools and workplaces), and the working and/or learning processes at the different venues. The levels cannot be strictly separated. Accordingly, if a decision is taken on one level, the other levels are usually affected too.

This article will explain the dual system as well as highlight and comment on the different endeavours for its modernisation. As a result, we will point out what can be learnt about education for professions. The concept of profession here is understood in a broad sense, including professional practice and approaches to learning in and for professions as well as all kinds of initial and further professional education, whether it takes place in school settings or at the workplace or at both venues. Thus, we pick out aspects from education in the dual system which might be regarded in professional education in general. We explicitly do not aim at discussing a transfer of the dual *system* to other *systems* of professional education in detail but only comment briefly on it. Through our approach, we aim at contributing to solutions for the problem of effectively developing professional (occupational) capacities that are important for fulfilling both personal and societal needs.

The article starts with a description of the historical development of the dual system and its current structure in Germany. After that, an overview of current challenges and reform approaches will be taken into account. Consequently, we select relevant topics to be looked at in more detail. The selected topics address the different levels of the dual system and are – in our opinion – relevant both from a national and an international perspective. On the level of institutions, we discuss the parity of esteem between general and vocational education on the one hand and between apprenticeship in the dual system and full-time school-based vocational education on the other hand. Furthermore, on that level, costs and benefits of vocational education will be discussed. On the level of syllabi we examine/consider initiatives that have been taken to more closely relate teaching/educational goals and contents to practice and workplace reality as well as to regional or branch-specific needs. For that purpose, new apprenticeships have been developed and existing ones have been re-structured according to modules. On the level of teaching-learning processes we focus on measures aiming at preparing apprentices to effectively cope with modern work structures and organisations that have been implemented. For that purpose, the relationship between learning and working is reconsidered and combinations of learning and working, both at the workplace and in school, will be addressed. Though it would be possible and worthwhile to argue solely from a national perspective, we also will discuss the topics from an international perspective, which allows us to consider the German approaches from other angles and integrate it in a broader context. As a summary, we will conclude what can be learned about education for other professions by taking into account the different levels and by regarding an international perspective.

16.2 Historical Development of the Dual System of Vocational Education and Training

The roots of the dual system can be traced back to the medieval ages, or even beyond, to the ancient Roman and Greek world (e.g. Münk 2010, p. 401). Based on early forms of apprenticeship, the dual system unfolds in three major phases:

Early forms of apprenticeship had been embedded in the craft system for both craftsmen and merchants. The apprentice worked together with his (or her) master craftsmen in his/her shop or travelled together with the master merchant to trade merchandise. Apprenticeship usually followed the so-called *Imitatio Majorum* principle, which refers to the sequence of observation, imitation, autonomous accomplishment, and customisation (Kell 1995, p. 371). It aimed at providing the apprentice with abilities and skills matching the conventions and the accepted behaviour in the profession and the respective craft system (Bruchhäuser and Horlebein 2010, p. 408). Due to technological and cultural developments in industry and society, general knowledge, e.g. qualifications of reading, writing and accounting, became more and more important, and thus schooling became necessary in order to prepare apprentices for job requirements (Pahl 2012, pp. 25ff; Reinisch and Götzl 2013, p. 20).

The founding phase of the dual system in Germany can be dated back to the late nineteenth and early twentieth centuries (Greinert 1995). The craft system decomposed because of the advent of a more liberal trade law, as fixed in the Trade Regulations of the Northern German Confederation. However, the empire politics aimed at protecting craft by law in order to prevent middle-class, respectively small firms and traders from becoming proletariat (Greinert 1995, p. 21). Amendments for protecting retail trade, dated 1897, enabled the recovery of corporate structures and the apprenticeship model comparable to that of the former craft system. Furthermore, education of apprentices required a master's certificate. Besides traditional apprenticeships, schools for further education with a specific focus on vocational subjects (in German: Fortbildungsschule) were established. In 1900 the German Pedagogue Georg Kerschensteiner had recommended gearing the Fortbildungsschule towards vocational education and, in so doing, to legitimise it by claiming that vocational education and professional work contributes to general human education. Through vocational education, non-academic youth should also be integrated into the national state (Gonon 2009). Between the end of the nineteenth century and the beginning of the twentieth century, the number of such vocationally oriented schools increased. To sum up, the formation of the Fortbildungsschule is result of the promotion of small- and medium-sized craft enterprises on the one hand and youth education in times of crisis at the turn of the twentieth century on the other (Harney 2006, p. 233).

The *consolidation phase* between 1920 and 1970 was influenced by the attempt of German industry to establish an own apprenticeship model under exclusive control of companies. This was motivated by qualification needs of industry (engine building and electrical industry) that grew comparatively fast and used modern production methods. Consequently, workforce in industry had to learn to cope with new technology. For that, instruction at specific learning venues (e.g. apprenticeship workshops or factory schools), standardised courses, curricula, and test requirements were necessary (Herkner 2013, p. 16; Pahl 2012). However, industry could not implement its own apprenticeship model but instead implemented a new qualification type for skilled workers/technicians that compares with the level of assistant in craft (Benner 1997, p. 56). Since the 1930s, the Fortbildungsschule has been renamed Vocational School (in German: Berufsschule). In 1938, (empire-wide) 3 years of compulsory VET was enacted and, in the beginning of the 1940s, the weekly hours of schooling were fixed while curricula and both school authorities and financing were harmonised. In the 1950s, the craft was successful in enforcing comprehensive regulations for VET established by the Handicrafts Regulations Act (in German: Handwerksordnung). However, a VET law was not enacted until 1969, the so-called Berufsbildungsgesetz (Wahle 2007, p. 195).

The *further development phase* since the 1970s is characterised by rationalisation of the dual system and by enhanced state influence. The Berufsbildungsgesetz regulates the responsibilities of Federal Government, the German States, the representatives of employers, the trade unions and, to some extent, the teachers for vocational education. Furthermore, a reporting system aimed at making the developments on the apprenticeship market transparent was established in form of the vocational

education report, which is published yearly. In addition, since 1972 inter-company vocational training centers were established to compensate apprenticeship shortcomings, especially for small firms. Almost every apprenticeship now also had a structure that separates 1 year of basic vocational qualification from 2 years of specific vocational education (Greinert 1995, p. 32).

16.3 The Dual System of Vocational Education and Training – Basic Features

Worldwide, different systems of VET exist. In order to differentiate between these systems, the role of the state can be taken into account. In market economy systems (e.g. USA, Japan, Great Britain) the state is not involved in vocational education. In school systems (e.g. France) the state plans, organises, and controls vocational education. In state-controlled market economy systems (e.g. the dual systems in Germany, Austria, and Switzerland), the state defines regulations for vocational education, but the private sector is responsible for the supply of training places. All other systems can be interpreted as variation of these three basic types.

Students can enter the dual system after finishing 10 years of compulsory schooling on the secondary level I at a grammar school, a comprehensive school, an intermediate school, or a secondary general school. Entering the dual system means entering the secondary II level. As an alternative to the dual system, students can choose to complement senior classes in grammar school, to attend a specialised grammar school, to attend a full-time vocational school, or to remain in the transition system to receive preparation for an apprenticeship in the dual system. After finishing one of these alternative tracks, it is also possible to apply for an apprenticeship training place. Currently, about two-thirds of students leaving school start their professional career by beginning an apprenticeship in the dual system (BMBF 2013, p. 9). Overall, the dual system can be regarded as bridge from school to work-life.

Apprenticeship in the dual system is only possible for state-recognised training occupations (Greinert 1995, p. 35), of which currently approximately 350 exist, ranging from baker, boat-builder, hairdresser, optician, and precision mechanic to sales associate or clerk. Successful completion of an apprenticeship programme entitles the trainee to practise an occupation as a qualified skilled worker in either the training occupation (Hippach-Schneider et al. 2007, p. 25) or an occupation which requires the knowledge and skills of the training occupation. Training occupations and occupations/professions in the labour market in general do not necessarily correspond. In contrast, compared to the number of training occupations, multiple occupations/professions exist. Occupations can be grouped according to areas, main groups, groups, sub-groups, and genres. Currently, 10 areas, 37 main groups, 144 groups, 700 sub-groups, and 1,286 genres exist. Areas are, for example, agriculture, forestry, and gardening or raw materials production, production and manufacturing, or commercial service, trade, sales, hotel and tourism. Main groups

in the latter area are purchasing, sales, and trade occupations or sales, tourism, hotel- and restaurant occupations. Groups in the purchasing, sales, and trade occupations are purchasing and sales or trade. Sub-groups within purchasing and sales are occupations in purchasing or clerks in trade. Genres within purchasing and sales are occupations are, for example, specialised trade clerks and unspecialised trade clerks (Bundesagentur für Arbeit 2012). Consequently, an apprentice who completed a training occupation as a clerk can apply for numerous occupations and work as a clerk or as specialised or unspecialised trade clerk, or even as a secretary.

The dual system is not the only possibility for complementing an apprenticeship. Full-time vocational education in schools is offered as well, but it is not as established and appreciated as vocational education in the dual system. Furthermore, the dual system has to be strongly distinguished from the general education system. It has its own vocational education legislation as fixed in the *Berufsbildungsgesetz* (Greinert 1995, p. 10).

The name dual system refers to the fact that two learning venues in two institutions, namely vocational schools and workplaces in companies, cooperate in order to qualify apprentices for a profession (Greinert 1995, pp. 10–16). Depending on the state-recognised training occupation, the course of the apprenticeship takes 2–3.5 years. The apprentices spend approximately three fourths of this time in the companies, one fourth in vocational schools. The different learning venues are embedded in different systems formed by a different history, i. e. the vocational training system on the one hand and the school system on the other. Both systems aim at cooperating in qualifying the apprentices (Harney 2006, p. 232). From a legal point of view, the young people are both student and employee. The most important features of the dual system can be described as follows.

16.3.1 Companies/Workplaces

Training places are offered by companies in the private sector (industry, craft, and agriculture), institutions of the public sector, offices or institutes of the liberal professions and, to a limited amount, by private households (Greinert 1995, p. 35; Hippach-Schneider and Hensen 2012, p. 16). A provider of training places, e.g. a company, has to be approved by the respective chamber or guild. In the dual system, “the state delegates regulatory competence for training system to corporatist bodies. [...] They have the status of ‘competent bodies’ (*zuständige Stellen*) and play a crucial role in the organisation, administration and examination of vocational training” (Ertl and Sloane 2004, p. 3). Chambers and guilds as corporatist bodies regulate apprenticeships by supervising final exams, by registering training contracts, by establishing inter-company vocational training centers, by allocating training warranties to companies, by reforming apprenticeships, and by controlling the training quality (Harney 2006, p. 232; Rebmann et al. 2011, p. 13). The in-company training follows mandatory training regulations legal for the respective state-recognised training occupation and valid for all companies independent of

branch or size. The development and remittal of the training regulations is the responsibility of the federal government and should guarantee comparable standards for in-company training nationwide. However, representatives of trade unions as well as of employers' and employees' head organisations are involved in the development of training regulations. Every training regulation comprises denomination, length (duration) of the apprenticeship, occupational profile, framework plan, and examination requirements (Rebmann et al. 2011, p. 13).

Trainers only complete a basic course on pedagogical eligibility (AEVO 2009), or sometimes even none. Usually trainers work as full-time employees and not as full-time trainers. Thus, they often suffer from heavy work pressure and, consequently, time limits for taking care of trainees. Big companies usually are more likely to offer systematic training compared to small and medium size companies.

The companies finance the apprenticeships by paying training remunerations to the trainee on a monthly basis (Greinert 1995, p. 16). The individual company decides autonomously whether and what training is provided and how many apprentices they take (Hippach-Schneider et al. 2007, p. 59).

It should be mentioned that sometimes companies are not able to offer full apprenticeships. They either do not have enough trainers or sufficient technical resources. In that case, parts of the apprenticeship can be relocated from the individual company to an inter-company vocational training center. Alternatively several companies can form an apprenticeship network, thereby jointly taking care of an apprentice (Hippach-Schneider and Hensen 2012, p. 17).

16.3.2 Vocational Schools/Classes

Vocational schools have the task of complementing in-company training by imparting both general knowledge and job-specific knowledge to the students. The students (=apprentices) attend the vocational school 8–16 h a week. Education in schools complies with a framework curriculum that is developed for every state-recognised training occupation (Hippach-Schneider and Hensen 2012, p. 16) by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (in German: Kultusministerkonferenz), or rather its subcommittee, and is valid nationwide. As is true for the in-company training regulations, the framework curriculum aims at guaranteeing a uniform national standard for education in vocational schools. Because education in schools is the responsibility of the individual states (and not of the federal government), each of the German states can modify the framework curriculum according to specific needs but must adhere to central aims and contents. Furthermore, each state issues school laws which regulate kinds of schools (e.g. vocational schools, commercial high schools), educational plans, and lesson plans. In addition, each state issues regulations concerning tests, giving marks, promotion to the next class, and exams (Rebmann et al. 2011, pp. 9–10).

Teachers for vocational schools take 5 years of university education and graduate with a master's degree or a state examination. After that they have to complete a 1–2 year (depending on the regulation of the respective German State) internship in a vocational school. Only after completing these requirements are they fully certified to teach.

The respective German state, or specifically the local authorities' public funds, covers the costs for in-school education (Greinert 1995, p. 16). The German states "bear the costs of internal school affairs (e.g. supervision of schools, laying down of curricula, teacher training, teachers' pay), and the local authorities are responsible for financing external school affairs (e.g. construction, maintenance and renovation of school buildings, ongoing management, procurement of teaching and learning resources)" (Hippach-Schneider et al. 2007, p. 59).

16.3.3 Coordination of Schools and Companies

The coordination of in-company training and school-based learning is strictly regulated by a procedure to develop and harmonise training regulations and school curricula in order to jointly accomplish a central aim. As defined in every framework curriculum, the central aim of education in vocational schools is to support students in developing competence in action, which means possessing the willingness and ability to act deliberately and be socially and individually responsible in the workplace as well as societal and private situations. Competence in action develops in three dimensions, namely in professional competence, individual competence, and social competence (KMK 2011, p. 15; Dilger and Sloane 2012, p. 32). The same aim is true for in-company training. The coordination on the local level between individual schools and companies is not regulated and often either happens by chance or is instigated for specific reasons, e.g. misbehavior of the apprentice in matters such as daily attendance.

16.4 Current Challenges and Reform Approaches of the Dual System of Vocational Education and Training

The most important asset of the dual system is seen in the fact that it comes with a low rate of youth unemployment compared to other European countries. In Germany, the rate was about 9 % in 2011 (Esser 2011, p. 3; Hippach-Schneider and Hensen 2012, p. 10) and has remained low even during the latest economic crisis. Countries that implemented school-based vocational training or have no VET system are typically confronted with high rates of youth unemployment (Busemeyer 2012, pp. 6, 9). The dual system effectively enables the transition from apprenticeship to employment because vocational and occupational systems are closely linked (Bosch 2010, p. 37).

By offering apprenticeships, companies can easily support young workers in their commitment to professional development and thus recruit from a skilled workforce (Busemeyer 2012, p. 16).

In order to guarantee a skilled workforce, the dual system is under constant pressure to change or adapt in response to economic, societal, and educational developments. Those developments comprise, for example demographic change, the shift to the service sector, the development of a European work and education market, or new forms of work organisation (BMBF 2012). They lead to challenges in multiple areas: the availability and suitability of training places, the integration of low-skilled youth in VET, the establishing of a European framework for education and training, the training of a highly-qualified future workforce.

16.4.1 Availability and Suitability of Training Places

Taking the big picture of the apprenticeship market into account, the demand for apprenticeship training places exceeded the supply until 2007. In 2008 the global financial crisis negatively influenced economic growth and led to a drop in training places. Since 2011, the amount of training places has again increased (Bosch 2010, p. 37; Deutscher Bundestag 2010, p. 1; Hippach-Schneider and Hensen 2012, pp. 9, 18). Due to demographic change, companies lack skilled personnel. The age group of young people between 17 and 25 is expected to diminish about one-fifth (BMBF 2012, p. 5). Consequently, companies face the increasing problem of recruiting suitable apprentices (BMBF 2012, pp. 4, 7, 24; Autorengruppe Bildungsberichterstattung 2012, pp. 101, 107). The percentage of vacant apprenticeship training positions increased about 30 % (Esser 2011, p. 3). More than one-third of companies could not fill one or more apprenticeship training positions. Dependent on branch, size of the company, and the region, the imbalance of supply and demand on the apprenticeship market varies. Concerning the branch, problems mainly occur in the largest sector of the economy, the service sector (BMBF 2012, p. 5; Hippach-Schneider and Hensen 2012, p. 29), e.g. the hotel and catering industry, or the health care and welfare sector. In addition, a qualified workforce is missing in science and technical fields. In contrast, banks and insurance companies are less likely to run into problems. Concerning the size, small enterprises have more problems filling positions than large firms. And concerning the region, big cities in the western part of Germany with a balanced labour market and high dynamics are more likely to have a balanced apprenticeship market than big cities, also in the western part of Germany, which already have a high rate of unemployment and regions in the eastern part of the country (Krone 2010, p. 27f.; BMBF 2012, p. 33). Resulting from demographic changes, companies cannot afford to be as selective as before when hiring apprentices. Thus, the group of apprentices for one state-recognised training occupation in one company, and also across companies, sometimes may be very heterogeneous. That, in turn, may cause problems for both the trainers and the apprentices.

In order to support companies in recruiting a skilled workforce, some measures of deregulation were taken to make more training places available. For example, the regulations for in-company trainers' pedagogical eligibility were suspended for a couple of years in order to allow companies to offer apprenticeships without having officially-recognised trainers. In the field of skilled craftsmen, the requirement limiting the ownership of a personal business to only those certified as master craftsmen was suspended. State-recognised training occupations, which were less theoretically/more practically oriented and only last 2 years, were defined. However, all these measures had only limited success and have been partially abolished in the meantime (Busemeyer 2012, pp. 6, 20). Nevertheless, the supply-demand relationship on the apprenticeship market has improved since 2008, meaning that the supply of training places slightly exceeds the demand (BMBF 2012, p. 13).

Another approach to increase the supply of training places was to offer more full-time, school-based apprenticeships, that is to say vocational training in the education system. According to an amendment of the *Berufsbildungsgesetz* in 2005, the graduates of school-based apprenticeships should be allowed to take an exam established by the respective chamber or guild and thus become a fully-acknowledged, skilled worker without having been an apprentice in the dual system. However, a time limit was put on this regulation. It terminated in 2011 and did not lead to the establishment of a school-based vocational system (Deutscher Bundestag 2010, p. 8; Busemeyer 2012, pp. 7, 21).

From a financial perspective, the possibility of apportionment of costs was discussed to relieve companies who offer training places and motivate them to further invest in training. Furthermore, the federal government considered increasing investment in education (Busemeyer 2012, p. 5). The cost of training in the apprenticeship system for the companies was 23.8 billion Euros (15,288 Euros per year and apprentice) in 2007. This sum, reduced by productivity profits and other income for the companies, results in 5.6 billion Euros net costs or 3,568 Euros per year and apprentice (BMBF 2013, pp. 282–283). The states covered the cost for the vocational schools with 3.2 billion Euros (BMBF 2013, p. 280).

In order to match apprenticeship programs with labour market needs while subsequently guaranteeing a skilled workforce, a total of about 51 state-recognised training occupations have been newly defined and 147 existing state-recognised training occupations have been modified since 2000 (BMBF 2012, p. 64; Hippach-Schneider and Hensen 2012, p. 29). In the course of this modification, some apprenticeships have been modularised. Consequently, by structuring apprenticeships according to both mandatory and optional modules, apprentices can complete basic training and then specialise. Another approach was to restructure school curricula according to so-called learning areas instead of subjects (such as business, economics, bookkeeping, etc.) (Euler and Sloane 1997). The concept of the learning area was formally introduced by the Kultusministerkonferenz in 1996 (KMK 1996). Learning areas represent typical workplace situations or problems and thus are expected to better prepare students for the world of work than conventional curricula. Conventional subject-oriented curricula presumably caused difficulty integrating knowledge from different areas and applying it in real-life situations (Ertl and

Sloane 2004, p. 8; KMK 2011, p. 11). So far, no empirical evidence that learning areas are superior to traditional subject-oriented curricula – concerning the development of competences of apprentices – exists. However, the learning area approach is much more in line with learning theories such as problem-based learning, situated learning, and job requirements (see Sect. 16.5.4).

16.4.2 Integration of Low-Skilled Youth in Vocational Education and Training

Despite the lack of skilled personnel and anew rise in the supply of apprenticeship training places in the last 2 or 3 years, many young people remain in the so-called transition system; that is to say, after finishing (compulsory) school, young people are not able to get a training place because they are poorly qualified. They usually move to the transition system, i.e. 1 or 2 year education promotion measures or pre-apprenticeship training in order to gain access to VET (Busemeyer 2012, p. 16). The problem of integrating poorly qualified persons in the job market is still not successfully solved, though the number of people in the transition system has decreased slightly (Bosch 2010, p. 37; BMBF 2012, p. 4).

In order to reduce participation in the transition system, several measures have been taken (Euler and Sloane 1997; Siecke and Heisler 2011). For example girls' days and boys' days, which aim at letting boys and girls experience a company for a day, have been implemented as a measure of professional orientation. Substantive professional orientation contributes to thoughtful decisions about an apprenticeship and a professional career. In addition, under-qualified young people can participate in special training to help them acquire the basic qualifications necessary to start an apprenticeship. Again, the implementation of exclusively school-based vocational training attuned to the under-qualified could help integrate young people into an apprenticeship and the job market (Busemeyer 2012, p. 8). Furthermore, young people can be assisted by seniors in the initial phase of their apprenticeship or in situations of conflicts. Both of the latter measures can help avoid the termination of apprenticeships (BMBF 2012, p. 43).

16.4.3 European Framework for Education and Training

The German VET system should be attractive and competitive from a European perspective. VET should be outcome-oriented and oriented towards the labour market. In addition, competences, whether they are acquired in Germany or in another European country, and whether they are acquired in the VET or in the academic system, should be comparable in order to foster mobility of young people and to recruit a skilled workforce from other countries (BMBF 2012, p. 8). For that purpose, the European Qualification Framework (EQF) and corresponding National

Qualification Frameworks (NQF) were developed. The aim is to rank and compare competences independent of where and how they were acquired. The EQF is strictly outcome oriented and can be used to assess equal value of different educational backgrounds or different grades based on academic or vocational education (Esser 2011, p. 4; BMBF 2012, p. 7). This might facilitate the exchange between academic and vocational education and thus the permeability within the education system. In order to assess competences gained in foreign countries or in order to accredit informally gained competences, assessment techniques are still to be developed (Esser 2011, p. 8). Closely connected with EQF, the European Credit System for Vocational Education and Training (ECVET) and the European Quality Assurance Reference Framework (EQARF) for VET were developed. The ECVET aims at acknowledging credits gained during a temporary employment abroad or in different learning situations. The EQARF supports its member states in implementing quality control systems (Deutscher Bundestag 2010, p. 12). Some more initiatives of the European Union are in preparation (BMBF 2012, p. 8). The introduction of the new instruments is still on the way; therefore empirical evidence for this political perspective is still unavailable.

16.4.4 Highly Qualified Future Workforce

The increasing and more manifold use of information and communication technologies led to systemic rationalisation, and consequently new forms of work organisation. Systemic rationalisation is associated with forms of ‘lean production’ and ‘lean management’, more team-work and working on projects. Routine tasks have been automatised, and employees are more frequently in charge of controlling processes. Furthermore, workplaces have been virtualised and now come along with flexible working hours and new requirements for work-life-balance. The developments led to more complex tasks and thus to new challenges of coping with workplace requirements such as understanding complex interrelationships, working independently, and using soft skills (Achtenhagen 1997, p. 611; Bosch 2010, p. 45; Esser 2011, p. 3). To sum up, workplaces require a highly qualified workforce. This has to be regarded in the course of adapting both previously existing and newly developing state-recognised training occupations, e.g. by integrating academic contents in vocational training programs. An example for this is the training occupation of a mechatronics fitter, which was invented in 2006 and requires academic skills such as planning and controlling work processes, checking and evaluating work results, or programming mechatronic systems (Ordinance on Vocational Education and Training in the Occupation of Mechatronics Fitter 2011, § 3). In the field of commerce and administration, for example, the regulations of the training occupation “agent in marketing communication” includes many competences that are also part of academic programs (Ordinance on Vocational Education and Training in the Occupation of Agent in Marketing Communication 2006, § 3). It is assumed that the tendency for higher qualification will continue over the next few years

(BMBF 2012, p. 5; Krone 2010, p. 30). Consequently, this might not only lead to more sophisticated apprenticeships, but also to more competition between vocational education and academic education as well as to problems for lower skilled young people to either have access to those training occupations or to keep up with other apprentices. Presumably, the demand for academic education, but also for education in the dual system, will increase (Dehnbostel 1997, p. 167; BMBF 2012, p. 5; Autorengruppe Bildungsberichterstattung 2012, p. 101).

In order to prepare apprentices to cope with complex workplace requirements, more authentic and complex tasks and problems are assigned to them. The aim is to get them actively involved in learning, thus avoiding the accumulation of inert knowledge and better guarantee application of knowledge and skills from school to the workplace. Case studies, simulations, or simulation games often replace traditional forms of teacher-centred instruction (Achtenhagen 1997). As a consequence, the boundary between learning and working has become more and more fuzzy. The same is true for the division of labour between the institutions. Theory is no longer the exclusive responsibility of the school and practice of the workplace. Instead, both institutions have to combine learning and working with theory and practice (see Sect. 16.5.4).

16.5 Selected Reform Approaches in Detail

16.5.1 *Parity of Esteem Between General and Vocational Education and Between Different Vocational Education Programmes*

16.5.1.1 Parity of Esteem Between General and Vocational Education

Parity of esteem is an important component in the education debate both internationally and in Germany. For many decades, a range of groups involved in educational policy in Germany have been calling for parity of esteem between general and vocational education, bringing many arguments to support their case (BMBF 1997, p. 9). Their focus is on initial training. However, they also acknowledge parity of esteem as a sound basis for further education in the process of lifelong learning and as a measure to boost individuals' career prospects (Weiß 2000, pp. 69–71).

While those involved in educational policy fundamentally accept vocational education on its own terms, the reality of the labour market is that vocational education courses are still not seen as being as attractive as general academic courses. The current thrust of Germany's long-established entitlement of qualifications (Kell 1982, 1987) privileges academic qualifications in terms of both social and occupational status. When measured in terms of income, prospects for advancement, and field of activity, academic qualifications outperform vocational education qualifications (Adler et al. 1993, pp. 3–4; Berger 1998, p. 46).

Over recent years, a number of initiatives have therefore been launched in Germany to achieve parity of esteem. First, since the beginning of the new century, the concept of vocational education itself was given a boost by modernising occupational profiles (Dybowski 2000). The idea was to work towards an independent system that is as attractive to the labour market as academic education (Adler et al. 1993, pp. 8–10). The educational policy rationale behind this approach was the argument that, though the content and ways of learning for vocational education courses are not of the same nature as comparable academic courses, they equip students with wide-ranging practical skills and may therefore be seen as being of equal value (Kell 1987, pp. 154–155).

Second, other initiatives focused on establishing formal links between the two strands. We shall give brief details of just a few examples of educational practice in Germany (for a full account, see Pilz 2003). The examples can be subsumed under what is known as the permeability principle on the one hand and dual qualifications on the other. The permeability principle means that a qualification formally entitles its holder to gain access to a higher level of the general education system. The qualification may be purely vocational in its emphasis or may add general educational competences to vocational competences (combined form). Contrastingly, dual qualifications equip their holders with both a vocational education and a general education grade at the same time. Dual qualifications can be ‘integrative’ or ‘additive’.

The purely vocational forms of the permeability principle imply that vocational education is as capable as general education of equipping students with competences that enable them to complete tertiary academic courses. However, rather than the first form of parity mentioned above, this form allows – admittedly seamless – access to academic courses. It does not aim at presuming equal value for vocational and academic education, which would declare academic education after completing a vocational education degree obsolete. The best known example of this process is the opportunity open to master craftsmen to move into tertiary education without holding the *Abitur*, i.e. Germany’s school-leaving certificate that entitles holders to take university courses. Over recent years, more and more skilled workers have been taking advantage of this opportunity (Loebe and Severing 2011, p. 81). The combined forms of the permeability principle are offered by full-time vocational schools known as subject-specific grammar school (in German: *Fachgymnasium*), subject-specific secondary school (in German: *Fachoberschule*), or vocationally-oriented secondary school (in German: *Berufsoberschule*). Other countries may lack a direct equivalent of these institutions, which are all forms of vocational senior school. These institutions, whose operation varies from one German state to another, are very attractive in Germany. In the school year 2010/2011, a total of 12,296 students completed the *Berufsoberschule* and gained the qualifications to move on to higher education. In the same year, 42,135 students completed the *Fachgymnasium* and 57,793 the *Fachoberschule* (Statistisches Bundesamt 2013). To contrast, in the same year 476,580 apprentices successfully finished their training in the dual system (BMBF 2013, p. 197).

An example for the integrative dual qualifications would be that students who completed the dual system can also be awarded an intermediate school-leaving

certificate when they match certain minimum requirements (a mark of at least 3.0 – an “average” pass in Germany’s six-grade assessment system – and basic English language skills) (Ministerium für Schule und Weiterbildung des Landes Nordrhein-Westfalen 2008, pp. 42–43). Additive dual qualifications, in contrast, cover a greater scope of curricular content and, therefore, more teaching and learning units and contact hours than integrative dual qualifications. The extent to which vocational and general academic curricula are combined varies: there may be only marginal additions of vocational content to comprehensive academic content or vice versa; or the two curricula are fully completed by students. Successful students are awarded two qualifications, a vocational and an academic one. Providers of dual qualifications (Deissinger 2000) include vocational academies (17 % of all courses), the Baden-Württemberg Cooperative State University (21 %), universities of applied sciences (59 %), and universities (3 %) (BIBB 2011, p. 23). The providers differ in that they either offer university courses with a full apprenticeship or include practical training placements within a company during a more traditional course of study. In 2010, 50,764 students were taking such dual courses; by the following year, this figure had risen by 20.5 %, to 61,195 (BIBB 2012, p. 250).

The examples given point to ways in which parity of esteem may be boosted. Introducing a national qualifications framework in Germany (see Sect. 16.4) may also help to boost both parity and transparency. However, it will take some time before the impact in terms of changes becomes evident because it has not been fully put into practice yet.

16.5.1.2 Parity of Esteem Between Apprenticeship in the Dual System and Full-Time School-Based Vocational Education

Besides its dual system, Germany has a comprehensive system of full-time, school-based vocational education. Unlike the dual system, which operates uniformly across Germany, full-time vocational schools are governed by the federal states. This kind of decentralisation along with the burgeoning number of private educational schools means that this sector of the VET system is becoming increasingly opaque and complex in structural terms, with more marked regional disparities than ever (Baethge et al. 2007). Nevertheless, more than one million students attend full-time school-based vocational education, accounting for around 40 % of all students within vocational schools (Statistisches Bundesamt 2012).

In general terms, two types of full-time vocational schools can be distinguished. The first includes schools who aim at supporting students in acquiring those general educational qualifications, which are for prerequisite for access to higher education. The second includes schools whose main aim is to award vocational qualifications. These may be sub-divided into those offering partial qualifications (whose role is to equip trainees with the basics of a specific training occupation) and those offering independent qualifications, which offer a full course of vocational training accredited under German federal legislation (*Berufsbildungsgesetz/Handwerksordnung*) or a course leading to what is known in Germany as an “assistant occupation”, governed by federal state legislation.

We shall focus here on the second type and compare it with the dual system in terms of successful transition to the labour market. While trainees completing their training within the dual system have a good record of success in moving directly from training to employment (Granato and Ulrich 2001), only just over half of all trainees leaving vocational schools move straight into employment. Just under half are still not in employment a full year after completing their vocational education. Of these, more than one-third take a follow-up apprenticeship, 25 % embark on a course of academic study, and 40 % take further training within a vocational full-time school (Feller 2000; see also Müller 2003). However, access to employment is dependent on the demand of the labour market and on whether a comparable apprenticeship is available in the dual system. For example, students receiving full-time education for the health professions move directly into employment (Müller 2003) whereas, in the commercial sector, students completing a school-based apprenticeship are directly competing with apprentices in the dual system and thus are less likely to become employed (Feller 2004). In general, students completing full-time vocational schools are more likely to opt for further training than those completing an apprenticeship in the dual system. Just fewer than 15 % of all trainees from eastern Germany and a little more than 10 % from western Germany opt for further vocational training within 3 years of completing their initial training. Most of them opt for an apprenticeship within the dual system (BIBB 2012).

To sum up, it is impossible to argue that the dual and full-time school-based training models are of equal status. School-based training often lacks structured links with companies, depriving their students of what Feller (2004) terms “socialisation in the company environment” (authors’ translation). Potential employers, in turn, often lack insight into trainees’ competences. Given the current demographic trends, the significance of full-time vocational schools is under consideration. To strengthen the full-time, school-based vocational education by focussing on those occupational areas in which the dual system is not well established would be a plausible way forward.

16.5.2 Cost/Benefit Analysis of In-Company Training

If it is to be ensured that companies remain involved in training in the long term, even without state subsidies, then the costs and benefits of VET will be key arguments. In this regard, businesses’ decisions to offer apprenticeships do not need to be seen exclusively from a monetary perspective but in light of their motivation to invest in securing skilled workforce or enhancing their reputation instead.

Starting from a monetary perspective, according to Beicht et al. (2004), it is possible to further differentiate costs and benefits of training as follows: Gross costs include apprentices’ labour costs (their remuneration plus social security contributions), a proportion of their trainers’ labour costs, capital (such as apprenticeship workshops) and material expenditures, and other costs, such as examination fees. The benefits derive from the gain represented by the productive work of apprentices,

the savings of costs for external recruitment in case apprentices stay in a company once they completed their training, the savings of costs for not recruiting candidates whose skills are inadequate because they were not trained within the company, and the social kudos the company accrues from its involvement in vocational training.

The most recent research shows that the annual net cost of in-company training is € 3,596 per apprentice and per company (BIBB 2012, p. 262); this total is made up of a gross figure of € 15,288 (in which the main elements are € 9,490 for the apprentice's labour costs and € 3,292 for the trainer's labour costs), offset by the benefits, quantified at € 11,692. Compared with a previous cost/benefit analysis, the net cost of apprentices to German companies has actually fallen by 40 %, mainly as a result of apprentices being deployed more productively. The figures vary widely from company to company, and Wenzelmann et al. (2009, p. 3) even note that "across Germany, around one third of all trainees actually generate net benefit for their companies during their training, while 10 % of trainees cost their companies more than € 15,000 net on an annual basis" (authors' translation). Wenzelmann et al. (2009) offer three explanations for this very broad range. Firstly, they argue, salaries vary between eastern and western Germany; secondly, net costs per trainee are higher in large companies than in smaller ones, for example because paid trainers are often only employed in larger companies. It is, therefore, surprising that larger companies are more likely than smaller companies to be satisfied with the cost/benefit outcome of in-company training: 77 % of companies with more than 500 employees are "very satisfied" or "satisfied". Companies' subjective assessments confirm that providing vocational education within the company also pays off in economic and business terms, with 60 % of the companies being either "very satisfied" or "satisfied" with the cost/benefit outcome and just 11 % being "dissatisfied" (Wenzelmann et al. 2009). Thirdly, net training costs differ between individual sectors. For example, while the public sector, manufacturing, and commerce all have relatively high net training costs, these costs are much lower in agriculture and in hotels and catering. Moreover, the cost of training apprentices whose training is conducted partly in apprenticeship workshops is relatively high. According to Wenzelmann et al. (2009, p. 4) "the gross costs average € 20,063 whereas the benefit yields only € 6,890" (authors' translation). Wenzelmann et al. (2009, p. 10) conclude that companies generally benefit from training young people though apprenticeship and subsequent recruitment of apprentices by the company "[...] do not guarantee a positive cost/benefit outcome" (authors' translation). The companies surveyed reported being able to offset even more of the upfront costs in case their workers went on to gain additional skills and qualifications through in-service training, developing the specialist skills the companies needed.

Concerning non-monetary aspects, demographic trends in Germany and the corresponding shortage of skilled labour provide one possible motivation for companies to invest in training. It is possible to argue that companies are forced to resort to apprenticeships in order to ensure their own future supplies of skilled labour. Troltsch (2008) investigated the extent to which companies' willingness to become involved in training was directed to their own future needs for skilled labour. His findings show that companies that had internally recruited skilled workers with

intermediate skills levels in the past were more likely to offer training places so that they could continue to meet their own skilled labour needs. His survey also shows that the amount of apprenticeship training places within a company was not diminished by that company's past or planned recruitment of graduates from universities or universities of applied sciences. Ebbinghaus (2009) came to similar conclusions on the basis of a research project into quality assurance in vocational training. His findings show that providing training was one of the most important tools used by companies to meet their requirements for skilled labour, particularly when the company's needs were high (Ebbinghaus 2009, p. 28). These survey findings show that investment in VET can be lucrative for German business, particularly since providing such education also helps them to meet their own future needs for skilled labour. Company surveys also show that companies value the "high-quality product" (Kremer 2006; authors' translation) generated by the dual system of vocational training, using its quality and adaptability in particular to meet their own needs for skilled workers.

16.5.3 Definition and Modularisation of Training Occupations

Vocational training needs to evolve continually in order to keep pace with the changes in company environments arising from, for example, changes in working structures, challenges for the workforce, or shift to the service sector. The dual system's adaptability to the needs of companies is particularly evident in relation to state-recognised training occupations, which are constantly being updated or newly developed (see Sect. 16.4). As stated above, since 2000 more than 50 state-recognised training occupations have been newly defined (out of approximately 350 existing ones), and 60,000 young people embarked on training in these occupations in 2010 alone (BMBF 2012, p. 64; BIBB 2012, p. 130).

In addition to newly defined occupations, existing ones have been modified. Though from an international perspective, Germany's training system is often regarded as static and stable, closer scrutiny shows that there are moves towards innovation, flexibility by modularisation. However these moves are not achieved easily. For example, the modularisation of initial vocational training has been under discussion in Germany since the 1990s, but its generalised introduction has been hampered by the concerns expressed by both employers and unions (Pütz 1997). As a result, some forms of modularisation have been imposed in very specific sectors of the VET system, for example pilot schemes for continuing training of the 'older young unemployed' (Davids 1998) or preparatory modules that can, where appropriate, be acknowledged in an apprenticeship taken later (Brötz 2004). Training modules instigated as part of the *Jobstarter-connect* pilot scheme run in 14 selected training occupations are relatively new. The aim was to offer young people who had applied for, but not so far obtained, a training place an opportunity to transfer into a traditional apprenticeship and, hence, to gain access to the labour market. Curricula in the framework of the Jobstarter scheme have typically been sub-divided into

seven or eight modules. These modules are not individually tested and accredited; rather the intermediate and final assessments associated with traditional apprenticeships are preserved. Instead, the aim is to ensure that training offered in different locations can be linked more effectively by means of acknowledging the documented discrete elements and the training modules already successfully completed (Frank and Grunwald 2008; Frank and Hensge 2007). The pilot scheme is still in the development phase.

Modules are already built into standard apprenticeships in the form of optional extra training provisions (Berger et al. 2000). In addition, flexible elements have been integrated into standard statutory training frameworks by means of specialisms and electives. The most interesting development is the introduction of elective skills modules. In 1998, Germany introduced curricula of state-recognised training occupations in which compulsory components can be complemented by a certain number of elective modules. These modules can take 6–18 months. Twenty-five training occupations are currently structured this way, including laboratory, retail, and printing occupations (BIBB 2012, p. 91).

Experience with these forms of modularisation show that the moderate and tailored form of modularisation can improve flexibility, even in traditional and rather rigid VET systems, without destroying the advantages of what is known as *Beruflichkeit* – the holistic view of an occupation and of a skilled workers in Germany. For example, even smaller and highly specialised companies can offer the state-regulated, more generally-oriented apprenticeships because the elective components can meet the companies' specific needs (Pilz 2012).

16.5.4 Relationship Between Learning and Working

16.5.4.1 Renaissance of Work-Based Learning and Learning-Based Work

In response to fast technological development, changed management conceptions and work organisation (e.g. business process reengineering, systemic rationalisation), globalisation, the knowledge economy, and the ageing workforce, the relationship between working and learning has been reconsidered. The developments mentioned led to more complex and continually changing demands in the workplace, which in turn require continuous learning and thus integration of working and learning, throughout an employees' working life (Baethge and Oberbeck 1986; Buttler 1992; Achtenhagen et al. 1995; Engeström et al. 1995; Bergmann and Pietrzyk 2000; Schirmer 2000; Minssen 2006; Dehnbostel 2007). Scope and extent of learning across working lives are expected to increase proportionally. Occasionally it might even be necessary to learn entirely new occupations in order to attain a vocation and secure employability (Billett 2011, pp. 131–132).

In general, learning and working cannot easily be separated. Learning and working are similar in that both are conscious and goal-oriented actions. They differ in that learning aims at changing the individual, e.g. his/her knowledge or cognitive structure,

whereas working aims at changing the environment. The products of working are socially useful and serve as a means to satisfy material and intellectual needs and to secure existence. Learning and working can overlap or occur simultaneously (Kell 1989, p. 16; Bader 1992, p. 233; Pätzold 2011, p. 17). In the early forms of apprenticeship, as practiced in the crafts in the medieval, learning and working were not distinguished (Van Woerkom and Poell 2010, p. 1; Billett 2011, p. 131; see Sect. 16.2). On the contrary learning and working habitually took place in a conjoint process at the workplace (Dehnbostel 2007, p. 14). The strong interconnection of learning and working was necessary for the development of occupations and society or, as Billett (2011, p. 31) put it: “Key means by which humanity has sustained thus far and secured its achievements has been through learning in the circumstances of work”. Vocational schools or institutions focussing on learning are a comparatively recent phenomenon (Billett 2011, p. 131). They regularly come into play when the potential of workplaces to provide sufficient learning is limited and more formal and organised forms of learning are needed. This was true for the founding phase of vocational schools in the early twentieth century (see Sect. 16.2).

“From the second half of the 1980s the learning potential of the workplace has been rediscovered” (Van Woerkom and Poell 2010, p. 1). The potential of workplaces as learning venues (not only as the venue where what was learned elsewhere is applied) is seen in that workplaces are authentic environments that provide opportunities for combining formal and informal learning, individual and team work, and exchange of ideas between experts and novices. In addition, workplaces are assumed to better guarantee transfer of knowledge and skills to working situations than learning in school contexts (Severing 1997, p. 310; Billett 2011, p. 132). These and other features of authenticity cannot be reproduced easily. Sometimes they are neither known nor can they be anticipated (Severing 1997, p. 310; Dehnbostel 2007, p. 16; Van Woerkom and Poell 2010, p. 2). Thus, schools in many cases might not be able to provide effective preparation for the workplace due to teaching-learning processes that focus on declarative knowledge and not on imparting students with the procedural knowledge they need to accomplish everyday tasks in the workplace (Billett 2011, p. 133). Furthermore, dislocating learning from workplaces to schools can cause rote learning and thus serious motivational problems. Apprentices might be unable to make sense of what they learn due to the fact that they do not know when and how to apply the knowledge.

Though workplaces account for high learning potentials, they have serious learning restrictions to be taken into account. For example, routine tasks to be carried out only have very limited learning potential. Furthermore, if tasks are (partly) processed by computers, underlying principles or theories cannot be observed or physically perceived (Achtenhagen et al. 1995). Consequently, additional training is necessary. Another argument is that if working and learning are situated in only one specific workplace situation, transfer might be hurt unless systematisation and abstraction is added through training. Last but not least, tasks characterised by high physical and mental stress or by devastating consequences in the case of erroneous accomplishment are not even assigned to apprentices. Consequently, those tasks cannot be exploited for learning (Severing 1997, pp. 307–317).

16.5.4.2 Forms of Combining Work-Based Learning and Learning-Based Work

Against this background, the question arises as to how schools and workplaces can contribute to the re-integration of working and learning during an apprenticeship in the dual system and how the traditional division of labour between the learning venues can be (re-)defined. For that purpose over the last three or four decades several forms of combining learning and working have been established at the different venues. Dehnbostel (2007) suggests categorising the different forms as follows:

1. Learning takes place directly at the workplace (learning while working) like in traditional forms of apprenticeship or in communities of practice.
2. Learning is strongly connected to working, however dislocated from the shop floor to a separate place in the company (work-connected learning). Typical forms of work-connected learning are so-called learning islands or learning factories, which were established in the 1990s in the automotive industry. The idea was that apprentices learn to complete tasks for different sectors of production in groups (e.g. mounting, tool design, construction) guided by a trainer or an experienced employee. The apprentices can spend up to 6 weeks in one of those decentralised venues. Examples for more modern forms of work-connected learning are internships or quality circles (Debener and Siehlmann 1992, pp. 279–278; Achtenhagen 1997; Dehnbostel 2007).
3. Learning takes place in a specific institution, e.g. a vocational school, but is oriented towards working (work-oriented learning). Work-oriented learning is usually implemented by different forms of complex learning environments, that is to say management games, case studies, role plays, practice firms, or projects to be accomplished (Achtenhagen 1997; Dehnbostel 2007). The idea is to put apprentices into authentic situations in which they have to solve complex everyday-life problems. Working on the problems should enable them to understand complex interrelationships and apply knowledge in new situations and to new tasks. In contrast to workplace situations, complex learning environments are characterised by an instructional design that focuses on enabling learning.

Both schools and workplaces contribute to combining learning and working at the respective venue. However, joint projects between schools and companies can rarely be found. Some approaches aiming at combining working and learning across the venues in the course of model experiments or individual research studies have been undertaken (WOKI 1991; Buschfeld et al. 1995; Krafczyk and Walzik 2001; Kremer et al. 2001; Fürstenau 2003). However, in most cases cooperation between schools and workplaces is limited to mutually informing one another about expectations, experiences, and problems in daily routine of apprenticeship or in agreeing upon measures which are then taken as self-dependent at the individual venue regarding the respective institutional framework (Buschfeld and Euler 1994, p. 10). Consequently, it is left to the apprentices to integrate the experiences made at the different venues. This might be a problem in dual systems.

16.5.4.3 Research on Work-Based Learning and Learning-Based Work

To identify whether the learning potential of workplaces is exploited in the course of apprenticeships, some studies were conducted (Getsch 1990; Keck 1992, 1999; Noß and Achtenhagen 2000; Rausch 2009). The studies reveal that the learning potential depends on both the apprentice and the situation. On the part of the apprentices, their attitude towards learning, their learning premises, and their behaviour play a decisive role (Noß and Achtenhagen 2000, p. 238; Rausch 2009, p. 18; for the general discussion on workplace learning Billett 2010, p. 13). On part of the situation, mainly the tasks and the trainers have to be taken into account. Apprentices are often only given routine tasks, e.g. copying, filing, searching, or they become acquainted with only parts of complex business processes and are not allowed to take on responsibility (Keck 1992, pp. 293–294). Tasks assigned are inadequate, that is to say they do not meet the apprentices' premises, are not interesting, and not new. Criteria identified by research on work design or designing tasks as crucial for learning and motivation, such as autonomous, manifold, and complete actions, and feedback (Hackman and Oldham 1976; Hacker 1986; Volpert 1989; Bergmann and Pietrzyk 2000, p. 42) are not achieved. Thus, learning potential is only limited (Noß and Achtenhagen 2000, p. 238; Keck 1999, p. 170). In addition, immediate, elaborate feedback, assistance, and support of the trainers, which positively influences learning at the workplace, are not regularly given (Bahl et al. 2009, p. 2; Rausch 2009, p. 20). Reasons can be seen in that the trainers decide which tasks they assign to the apprentices and whether and how they give feedback, or whether they are available for assistance. The assignments, in turn, depend on how the trainers perceive and assess the motivation and the competence of the apprentice (Keck 1999, p. 179). The ability and readiness to assist the apprentices, however, depends on the daily pressure of work, interest in training, supervising competence, and trainers' occupational biography (Keck 1992, pp. 293–294; Keck 1999, p. 179; Rausch 2009, pp. 19–20). However, taken as a whole, research on the learning potential of workplaces in the course of apprenticeships is deficient (Beck 2005, p. 549).

Concerning the evaluation of work-based learning in schools, many studies have been carried out in order to assess complex learning environments, e.g. management games or case studies, which should enhance problem-based and self-regulated learning. Results show that complex learning environments contribute positively to the competence development of apprentices. Tests on retention, development of structured knowledge, problem solving, transfer, or argumentation skills prove the efficacy of those environments. However, in many studies, groups instructed traditionally and complex-learning-environment groups did not differ significantly. In addition, data show that students have difficulty understanding complex systems, applying knowledge to new situations, or working together in groups. Overall, complex learning environments do not hurt learning but are not generally superior to traditional instruction. It seems that their potential is often not fully exploited (for an overview see Fürstenau et al. 1999; Beck and Krumm 2001). In this respect it is of main interest to prepare teachers for instruction based on complex learning environments. This is necessary because teachers face challenges when using those

environments. In addition to deep knowledge of the contents, structure, and functioning of the respective environment, they have to leave their role as knowledge provider and act as moderator, coach, advisor etc. (Rebmann 2001, p. 23).

16.6 Dual System(s) of Vocational Education and Training Seen from an International Perspective

From an international viewpoint the societal, economic, and educational challenges are not very different from Germany's. Transnational organisations forecast the skills need in Europe with a specific focus on a highly-qualified workforce, which becomes more and more important. The growing service sector especially needs skilled workers (Cedefop 2012). Though sceptical voices warn not to overestimate the benefit of skills development for economic growth (Nilsson 2010), work- and vocationally-oriented education is regarded a key issue for solving the problems of economic growth and social inclusion (ILO 2010). That is why VET systems are important but have to be modernised (Cedefop 2009).

There is a growing literature which aims at suggesting reforms in a variety of countries because the satisfaction with existing VET systems is low. Publications, like Alison Wolfs' "Review of Vocational Education", recommend beside other elements more apprenticeships, in this case for England (Wolf 2011). And, on a world scale, the quest for a robust education for young people who do not attain either academic or specific higher education has focused on VET and on apprenticeships specifically (Rauner et al. 2009). Publications such as "The State of Apprenticeship" (Steedman 2010) and "Apprenticeship Systems and Issues" (Steedman 2012), a paper in the name of the ILO for the G20 Task Force on Employment, are in line with the endeavours towards enlarging dual apprenticeship models on a world scale, as Britain is attempting, which foster viable ways of introducing such reforms (Dolphin and Lanning 2011). These papers fit with other claims that depict developments in Ireland and other places, where policy makers decided to "rediscover" apprenticeships (Nyhan 2010; Rauner and Smith 2010). Apprenticeships, in this understanding, cover a range of criteria, e.g. a legislative framework, a clearly defined duration, emphasis on workplace attendance, nevertheless orientation towards a programme of learning, formal assessment leading to a recognised certification, and wages for the youngsters. If one of these criteria is missing, it is more a traineeship, an internship, an informal apprenticeship, or just work-place learning (Steedman 2010, p. 3).

The dual system or, more precisely, elements of duality play a prominent role in these reform approaches. Like in Germany, apprenticeship models that combine workplace learning and school attendance are recommended. A longstanding tradition in adding a complementary scheme of "apprentissages" can be observed in France (Ott 2013). The US, Canada, and Australia are debating how to establish or to strengthen apprenticeships as well. And countries like England, France, Italy, Spain, and Sweden try to introduce apprenticeship or more dual system-like

schemes in order to open new pathways, especially for low-achieving students (Gonon 2004; Rustico 2013). Most countries do not aim at replacing one system with another but to offer more opportunities of training for more youngsters.

From an international viewpoint the most important benefit of the dual systems such as the ones in Germany or its neighbour countries (Switzerland, Austria, and Denmark) is seen in the fact that the youth unemployment share is much lower than in other European states. The explanation for this favourable situation seems to be quite evident: due to a smooth transition from school to work but also due to the engagement of employers, the integration into the economy is much easier to achieve than in school-based systems (Steedman 2012, p. 1). In addition, another signum of countries with dual systems is seen in the fact that higher completion rates at the secondary II level are achieved. This shows that VET in a dual system is a valid alternative to traditional schooling and an incentive for youngsters not to abandon education too early. In considering dual systems, it is of great interest for other countries how Germany is able to involve firms in the training system and why and how firms are willing to train young people. The existing literature sees one core element in the coordination of relevant stakeholders (Busemeyer and Trampusch 2012; Gonon and Maurer 2012). Besides the private engagement of firms and also public investment, the role of players in the field is decisive. This leads to the fact that political culture is important in order to coordinate efforts towards providing a system.

Although the dual system is seen mainly in the light of its advantages, the following challenges are considered as well. A lack of a highly qualified workforce is an issue which gains more and more importance, even in countries that have implemented a dual system themselves. It is the demographic change including lower birth-rates of the home-grown population specifically which leads to a demand for mainly highly qualified but also a lower qualified workforce, which is often covered by recruiting specialists or specific categories of workers from abroad.

Furthermore, researchers claim the equity aspect. There is a gender bias related to professions as in other nations. Besides this, the social division remains a topic of controversy. It is much more likely that a youngster from a poor educational background and of working class has more difficulty entering an apprenticeship or accessing an appropriate school. The growing transition system leads to a prolongation of the status of an applicant without a guarantee of continuation (Mayer 2010; Hupka-Brunner et al. 2012a, b; Siecke 2012).

Dual systems are criticised or questioned when the debate is about tertiary education. The tertiary education completion ratio is comparatively lower than in mainly school-based education nations. In a knowledge society, the tertiary level of education is seen as a decisive advantage in mastering future challenges. Like Germany, Switzerland and Austria are also faulted for failing to provide a sufficient number of university graduates. Moreover, there is a debate as to whether the dual system in these countries is suited to the knowledge economy and whether it should be reformed. New schemes of easing the access to higher education and establishing new programs in the field of higher vocational education have been realised. Full-time vocational education and training school systems keep some advantages

and are also easier to handle for certain employers: they have no costs for education. However, they have problems of recruiting skilled workforce.

As a result, we can talk about a paradox: international policy extols the dual system as a remedy for youth unemployment and getting the firms willing to train. Nevertheless, there are certain constraints caused by the shortage of a highly qualified workforce and a decreasing tendency to integrate weak learners.

16.7 Conclusions – What Can Be Learnt About Education for Other Professions?

16.7.1 Conclusions Concerning Selected Reform Approaches

As already indicated in the beginning of this contribution, the question of learning from the dual system has to be seen on different levels. The basic assumption is that the dual system as a nationally rooted model is in an on-going reform process on all levels and that it is dynamic, flexible towards the education system, the needs of the economy, the workplace, and adaptable to new challenges. However, the process of modernisation is gradual and evolutionary in nature and does not represent the ‘big bang’ approach found elsewhere. The reasons for the approach are to be found largely in the corporatist structure of the players involved and in the balance of power between them (Thelen and Busemeyer 2012).

On the level of institutions, the relationship between academic education and VET illustrates that equalising the value of vocational and academic education or awarding general (academic) qualifications within the VET-system would be two possibilities to reach parity of esteem between the two systems. However, vocational training with a strongly practice-based component will stand the test of ‘academic drift’ only when the quality of vocational training is maintained at a high level and when transition possibilities from VET to academic education are either created or preserved. It is self-evident in this context that the different players have to negotiate and to agree on how to cover the emerging costs.

Concerning the relationship of full-time, school-based VET and VET in the dual system, regulatory activities of the federal government have to be critically assessed. Where competing structures are maintained, of which one offers fewer labour market prospects than the other, the inferior form of VET degenerates into the ‘second choice’ provision, which is disfavoured by potential students. Given the current demographic trends, the significance of full-time vocational schools is to be considered. Occupational areas in which the dual system is not well established could be an important opportunity to establish full-time school-based VET.

With regard to financing, in Germany, the state is not required to subsidise companies that become involved in training, a measure that has met with only modest success in many other countries. Thus, transfer of this specific feature of the dual system might be difficult, and forms of financing have to be negotiated.

On the level of the curricula, increasing differentiation and flexibility has to be discussed. This phenomenon is relevant not only to VET; the entire German tertiary education sector will eventually be affected, once the Bologna process reforms take full effect. The English-speaking countries in particular have many years' experience with modular curricula in both the academic and the vocational context. However, this is still a comparatively new area for Germany, and success will depend on learning and making use of the experiences both of other countries and of other parts of the national system. Thus, the design of the curriculum, the definition and the interlinking of discrete modules, along with the relationship between core modules and electives, are general problems. They are exacerbated when two coordinated learning venues are involved, as is the case within Germany's dual system.

On the level of processes of learning and instruction, it seems worthwhile to consider forms of relating working and learning both at the workplaces and at the schools and, if possible, in cooperation with both venues. Furthermore, on the side of the workplaces, it seems necessary to assign not only routine but also complex tasks to the apprentices as well as tasks that suit the apprentices' premises. In addition, adequate guidance and support of trainers seems to be crucial. For that purpose, trainers should communicate with each other. Furthermore, they have to be trained as trainers and need to be partly relieved from daily work pressure. Last but not least, the management should appreciate training efforts in companies. On the side of the schools, suitable learning environments have to be developed and integrated into instructional processes. In addition, teachers have to be prepared for taking over different roles and for systematically relating abstract and situated knowledge in the process of teaching conceptual knowledge.

16.7.2 Conclusions Concerning the Transfer of the Dual System to Other Contexts

Despite the great approval and recognition of dual systems, previous experience shows that an unreflective and non-tailored export of entire training systems is hardly possible. The list of failures of such transfer attempts in the last decades is quite long (Gonon 2012; Stockmann 2013). A variety of factors may hinder transfer – among them the following:

A country's tradition of VET and the way in which a culture develops historically is a major determining factor in how it designs its VET structures and processes. A VET system, thus, is a result of cultural preferences and conventions. Therefore, any change or more radical shift requires a very long timescale. Often, a pathway-bound development of VET systems can only be challenged in phases of juncture, triggered by a deep political or economic crisis. But even then, the common will for change and the resources for fundamental innovations are missing. The results of introducing dual VET patterns are often isolated projects, which are hardly sustainable (Schippers 2009; Maurer et al. 2011).

Another decisive factor is the disposition and aptitude of employers to train and the cooperation of “stakeholders”. In dual systems, employers, although competitors, have to work together to construct a mutual agreement and also to find compromises with other fractions of industry, commerce, and the trade unions. Furthermore, players collaborate not only with the state, the regional authorities, the chambers and associations but also with the parents and youngsters. All participants are crucial for a well-functioning system. Only if they work together and find compromises is such a system possible. Again, this is dependent on a cultural tradition and historically grounded socialisation. Political scientists define this as a strategic alliance of relevant actors, which is often the case in coordinated market economies (Streeck 2009). A broad acceptance of the VET system is one of its greatest strengths because the problem of ‘poaching’ that is evident in many countries can be avoided only when large numbers of employers are convinced of the benefits of training (Pilz 2009).

Another important factor is the interplay between schools and enterprises. A lot of transfer attempts simply implanted schools in another place, hoping that the enterprises there would be eager to collaborate. Or, as frequently occurs nowadays, employers are encouraged through incentives to offer training places without securing real access to suitable schooling (Wentzel 2011).

A further aspect, as well a result of a longstanding political culture, is the kind of legislation dealing with the contract of apprentices, the mandatory schooling, and many other regulations clarifying the interplay between the players involved.

This more or less widely acknowledged, decisive factor of culture and pathway-dependent history encourages comparative researchers to shift away from policy borrowing and head to policy learning. This focus is less ambitious and ubiquitous and discerns between global rhetoric and local practices (Steiner-Khamsi 2012). The focus is to establish reforms that are informed by successful models on a lower scale and level. Unlike a copy-paste procedure, the dual system and its functioning works as an inspiration for developing one’s own pathway.

To sum up, what has been learned in one country cannot easily be transferred to other countries. In the educational sector, policy borrowings are limited by different cultural frameworks (Phillips 2005). The necessary involvement of diverse stakeholders in the vocational sector as well as the interaction between the educational system and the employment system make a direct comparison between countries even more difficult. Nevertheless, German experiences on the individual levels can be exploited for learning about education for the professions in general.

Our very last remark accentuates the unique structure and capacity of the research the German speaking countries (Austria, Germany, and Switzerland) make into VET. In addition to researchers within private institutions, approximately 60 university chairs for VET and their groups are currently researching this area while teaching business and economics education. They cover the full range of topics on the levels set out above. In addition, there is also relevant research capacity within related disciplines, including sociology, political science, and psychology. Moreover, the centrally funded Federal Institutes for VET are also engaged in research, development, administration, and data gathering in this area. Their expertise represents a major contribution to modernisation initiatives and provides critical assessment of the trends towards modernisation.

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Chapter 17

From University to Professional Practice: Students as Journeymen Between Cultures of Education and Work

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Abstract The overarching research problem addressed in this chapter is the relationship between professional/higher education and professional work. The chapter will discuss the relevance of university education for professional practice with a particular focus on professional identity formation and formation of professional responsibility. We discuss how different professional programs and their traditions and cultures shape different curricular structures that have an impact on students professional identity formation and transition to work. We will also discuss experiences with and learning of professional responsibility in the web of commitments within educational settings and how new multiple expectations emerge and lead to new learning experiences when entering work life. The argument of the chapter is based on the rationale and findings from an extensive international research program, conducted between 2001 and 2008.

Keywords Higher education • Transition • Trajectory • Work life • Professional learning • Professional education

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17.1 Introduction

The overarching research problem addressed in this chapter concerns the relationship between higher education and professional work. This issue is of high relevance globally as well as from a European perspective. Against the backdrop of the common European labour market and the idea of mobility of the workforce, this also raises the question of how the higher education systems in different European countries prepare individuals for working life. During the twentieth century, there has been an increasing pressure on universities to incorporate a variety of professional programmes into higher education. As a result, the relationship between higher education and work life has become more complex and diffuse and thereby open for debate. There is growing awareness that not only the content of educational programmes, but also their design and forms of delivery may contribute to students' learning. The policies of the European Union emphasise the importance of employability and mobility of professionals. However, institutions and higher education systems are constrained by national legislation around higher education, and the policies are translated and materialised in local contexts of programs, curricula and through individuals. This means that there is not a one-to-one relationship between policies and what is implanted and enacted in national higher education systems.

Previous research has predominantly focused on graduate employability and career paths. Professional identity formation and the formation of professional responsibility in the web of commitments within and between educational settings and work contexts are less frequently studied (Solbrekke 2007). In this chapter, we address the formation of students' professional identities and professional responsibilities in their transition to work. We also discuss how different programs and their traditions and cultures embedded in curricular structures have an impact on students' trajectories from higher education to work life. The argument of the chapter is based on the rationale and findings from an extensive international research program covering three generations, conducted in the period 2001–2008. The research program takes its starting point within a comparative context of four universities in four European countries, Sweden, Norway, Poland and Germany, represented by the universities in Linköping, Oslo, Gdansk and Duisburg-Essen. The project was financially supported by a grant from the Fifth Framework of the European Commission of the European Union and was entitled 'Students as Journeymen between cultures of Higher Education and Work' (Dahlgren et al. 2007). The Journeymen metaphor has since then been applied to denote a broader international research program, including various projects that focus on a similar research object (Reid et al. 2011).

A Journeyman was historically a concept denoting an apprentice, learning a specific trade or craft as they travelled across Europe in the late medieval times. They arrived, unannounced and stayed with masters of the trade, trusting in their hospitality, to learn the skills and techniques of the master. The ideal was also to learn from different masters, and the journeymen wandered from town to town to get experience from different workshops. The travelling itself was an important

part of their training. In the industrial era, the journeyman became an apprentice that was employed and was bound to a master for several years. Eventually, they received a tradesman's certificate that allowed them to practice all aspects of the trade, without the supervision of a master. Today, the definition of a journeyman still denotes a stage of transition between a trainee and a master (Boucher 2006). It has even been argued that universities are the last guild – while the union and corporation aspects have almost disappeared, universities are still regulating standards of behaviour, levels of education and research (Huisman 2012). Huisman argues that universities in a sense function similarly to the old guilds, with their network of knowledge and learning that is still viable in the modern information age. “MSc and PhD students perhaps more than ever travel across the globe to study under certain masters, all within the university framework”, he argues (p. 4).

The findings from our studies show that the journey from higher education to working life is by no means a straight or well-defined path. Following students as journeymen has provided access to formal, informal, and non-formal aspects of their learning from different masters, in different educational and pedagogical settings as well as in work life settings. The research object, i.e. the relationship between higher education and work was conceptualised as a transition, framed within the metaphor of a journey. The Journeymen metaphor as a concept contains an aspect of historicity through the emphasis on the role of the subject. Another aspect of Journeymen is the mobility between and across different socio-cultural and material contexts. Journeymen can also be viewed biographically; the experiences are part of the formation of identities and responsibilities.

The chapter is structured in six sections. In Sect. 17.2, we give an overview of research on the transition between higher education and work-life. In the third section we elaborate on the metaphor of Journeymen and how this is used to structure the chapter. Section 17.4 provides a theorization of aspects of identity formation and professional responsibilities in relation to pedagogical and institutional conditions. In the fifth section, the theorizations are exemplified through empirical evidence. Finally, the sixth and concluding section discusses the contribution of the chapter to the understanding of professional identity and responsibility formation.

17.2 Research on the Transition Between Higher Education and Work

The relationship between higher education and work has during the recent decades been debated, not least in relation to the harmonisation of the educational systems within Europe and beyond through the Bologna process. Furthermore, the current climate of wider labour market uncertainty has also given the topic an intensified focus (Tomlinson 2007). Different perspectives on the expected usefulness of higher education have been put forward in this debate. Lindberg (2012, p. 9), who argues that these perspectives can be summarized in a number of ways, claims that higher education should be useful: (1) to the graduate in return for an investment in time

and money. The gain should be in the form of a job with substantially better conditions than the graduate would have had if he had not undertaken a higher education programme; (2) to the labour market in educating a competent workforce possessing skills and knowledge needed in the workplace; (3) to national economic prosperity by facilitating innovation and research, giving corporations a competitive edge over other countries and regions.

In line with these perspectives and especially 2 and 3 above, recent European policy documents strongly argue for the need for employers to engage in the design of curricula to ensure their relevance for the labour market and to encourage a more systematic dialogue between higher education institutions and employers (Bologna Beyond 2010 2009, p. 10). On the other hand, it has been pointed out that HE institutions “prefer a loose connection between education and work, stating that preparation for more complicated professional tasks is possible to obtain in other ways” (Dahlgren et al. 2007, p. 307). In that context the pressure concerning the labour market appears futile. However, we may argue that competitive pressure is stronger in most countries today. In his review, Tomlinson refers to research that confirms the importance of extra-curricular activities in the light of concerns about the declining value of formal education.

The question of graduate employment is a central topic within the research on the transition from education to work. A comparative study worth mentioning is the CHEERS study (Careers after Higher Education – A European Research study), which included more than 30,000 graduates (academic year 1994/1995) in 12 countries (see Teichler 2007a, b). The findings show that while the transition is somewhat precarious for a minority of graduates, most graduates enjoy a rather smooth and successful transition. However, the timing of the job search differed significantly by country (Allen and van der Velden 2007). According to the findings, graduates in countries such as Spain, Italy and France failed to find work within 6 months after graduation (ibid. and Stavik and Arnesen 2007). Furthermore, the findings from the CHEERS study indicate that success in finding work after graduation is more strongly related to countries than to field of study. For instance, while Norwegian, Finnish and Dutch graduates perceive education as a field of high specificity and preparation for high level occupations, graduates from Spain and Germany perceive education as a field of study characterized by low specificity and also as preparation for low level occupations (Murdoch and Paul 2007). The CHEER study also included questions concerning graduates’ values and orientation (Teichler 2007b).

In order to take national differences into account, Tomlinson (2007, p. 417), with reference to Hall and Soskice (2001), follows the *varieties of capitalism* approach and argues that countries with more coordinated occupational labour markets such as those in continental Europe tend to have stronger regulations on access to particular occupations due to a tighter coupling between individuals’ levels of education and their allocation to specific jobs. On the other a hand, in countries characterised by more flexible liberal economics and intensive competition such as the UK, the US and Australia there is a greater potential for displacement between the level of education and occupational position.

According to Leuze (2011), previous studies reveal similarities and differences in labour market outcome, where explanations refer to the field of study and countries, whereas differences by type of institution and type of degree are studied less often. In her study, she analyses the institutional stratification of German and British higher education. The findings indicate that the institutional set-up is important and the author concludes that a vertically differentiated higher education system is more likely to generate hierarchical differences in employment outcomes among graduates. As shown by Noeke et al. (2012), analysing the transition from higher education to work in five central and east European countries (post-socialist) the organization of higher education appears to be a central dimension of stratification. Not surprisingly, university master's degree holders enter the labour market significantly faster than graduates from vocational colleges and university bachelor programmes.

The concept of coherence between content and learning experiences from the classroom to professional practice is another central research topic on the transition from education to work. With respect to professional education the research points to a common criticism of the inadequacy of the theoretical content as a basis for professional practice (Smeby and Heggen 2012). The discrepancies have been characterized as knowledge gaps between knowledge acquired in professional education and knowledge demands of professional practice (Smeby 2012). However, to measure the level of transitional coherence is problematic as the research seems to indicate that the respondents report a higher level of coherence after several years in the field rather than after a few years after graduation (Smeby and Heggen 2012).

Finally, individual differences are important to take into consideration. Despite following the same programme, research shows that some students on the point of transiting to employment are significantly more oriented towards the labour market than others (Tomlinson 2007). These differences in orientation imply that graduates' emerging labour market identities are linked to other forms of identity such as social background, gender and ethnicity (Tomlinson 2007).

As argued above, there is a great pressure on higher education institutions to deliver an employable and flexible workforce. In addition to moving higher education institutions in new directions, this additionally challenges the ideas of what a professional should be and what we may expect from current professions and their members (Sugrue and Solbrette 2011). However, what remains commonly recognized is that professions and their members are assigned public responsibilities and granted a specific status and levels of autonomy to deploy expertise in the interest of both individuals and societal interests (Freidson 2001; McKee and Eraut 2012). Consequently, becoming professional implies more than acquiring substantial knowledge and skills to solve problems at work (Jensen et al. 2012). It also involves learning about and becoming engaged in the broader public, moral and social purpose of the profession. While, as reported above, a significant amount of research has dealt with different issues with respect to the relevance to work life of the educational outcome of graduates, there are few studies which critically investigate the formation of professional identities and the sense of responsibility in the transition from higher education to the work context, a theme that is of great interest and relevance in the changing world of education and work. We will be drawing on

findings from an extensive research program on the relationship between higher education and work life. Through the combination of longitudinal and cross-sectional data, a combination of different methods of analysis, and the development of a common analytic framework as described in the following sections, the Journeymen research program contributes to the knowledge of professional learning and professional identity formation. In the following section, we will outline our theoretical perspectives and how these become integrated through the Journeymen metaphor.

17.3 The Journeymen Metaphor as an Analytical Framework

The research object, i.e. the relationship between higher education and work as regards the development of professional identity and responsibility, was conceptualised as a transition, framed within the metaphor of a journey. Using metaphors as a rhetorical tool for interpretation is a common strategy in qualitative research. Often metaphors are considered to be powerful in conveying an immediate understanding of meaning (Janesick 1994). Metaphors can be used to construct a narrative contract with the reader, described by Atkinson (1990) as *hypotoposis*, a technique to capture the reader by means of lively and image-like descriptions. Additionally, a metaphor can be used not only as a tool to ensure immediate understanding of whole entities, but also as a means of giving a structured and analytical description of the dynamic functions or dimensions encompassed in the metaphor. Lakoff and Johnson (1980) have described the use of metaphors as a structured way of analysing an unknown domain (the target domain) with the help of concepts from a known domain (the source domain).

The authors argue that a metaphor is not just a figurative expression we choose after having experienced or thought about a situation; in fact, the way we label a situation is indicative of our understanding of the situation, linked to our previous experiences and knowledge. In that sense, metaphors make visible the experience and world-view of the researcher. It could be argued that the use of metaphors is counter-productive to generating new knowledge, and that the main contribution is only to confirm the prevailing prejudices of the researcher. Dexter and LaMagdeleine (2002) argue, however that the deliberate use of metaphors in the analysis of qualitative data communicates the emerging understanding and interpretation of data in a way that makes the researchers more aware of their subjectivity and personal pre-assumptions which otherwise may colour the interpretations, unknowingly to the researchers. Using a metaphor as an analytical concept means that we deconstruct the meaning of the metaphor with which we associate a certain phenomenon or social practice, so that the inherent functions and relations of the metaphor become visible.

The immediate understanding of the Journeymen metaphor as a concept is that of individuals travelling. When we deconstruct the metaphor further, we can discern

a function of historicity through the emphasis of the role of the subject travelling over time. Another function of the Journeymen metaphor is the mobility between and across different socio-cultural and material contexts. Journeymen can also be seen as comprising a biographical function; the experiences are part of the formation of professional identities and responsibilities of the individual.

A third discernible function of the metaphor is that of change through the obtained experiences of the journey. If we consider the relationships between the functions of the metaphor in the context of education and work, the change can be seen as the outcome of a mutual interplay between institutions and conditions of higher education and the students and teachers that populate them. The dimension of mobility in the Journeymen metaphor in this study hence implies more than a shift from one context to another; we are implying a trajectory of movement and change. The implications for our chosen focus of learning for professional work and the transition to work life in this sense are not only about how education impacts on people, but also how people impact on education. The Journeymen metaphor hence allows us to trace the subjective individual trajectories as well as the collective, socio-cultural aspects of the transitions from higher education to work with a particular focus on identity formation and professional responsibilities.

Another assumption with using the Journeymen metaphor was that basically the same journey, or in this context, educational initiatives, might bring different results in different national, institutional and disciplinary contexts. For that reason, the different course structures encountered by students were also included as a topic for analysis, and comparisons are made between different institutions and programs.

Following the metaphor of a journey, data was gathered at different points in students' travelling from education to work. Semi-structured interviews with freshmen students in their first year of studies and senior students in the last year of their Psychology and Political science studies were conducted, focusing on how they experienced their university education and how they pictured their prospective professional work. To supplement the interview data, curriculum documents concerning the different programs were also used. The project also included a longitudinal part, that put these same questions to senior students and later to professional novices, after 12–18 months and after 3 years of professional practice. The aim was to enquire into how they conceived themselves as professionals, and how they viewed their university education in retrospect, particularly in relation to their professional work. In parallel to psychology and political science, the Journeymen project also comprised related studies on the same research problem in other disciplines and professional programmes such as mechanical engineering, computer engineering, law, and teacher education. The findings from these studies are also used to inform the theorisations in this chapter.

We have chosen to focus on professional identity formation and responsibilities in the transition from higher education to work life. There are several reasons for this choice. As argued above, there is a great pressure on higher education institutions to deliver an employable and flexible workforce. In addition to moving higher education institutions in new directions, this also challenges the ideas of what a professional should be and what we may expect from current professions and their

members. Some express fears that the recent years' political engagement in the economic and functional purpose of higher education commodifies 'knowledge' and narrows 'professional competence' to 'technical skills'. It is claimed that this trend challenges the moral and social purposes of both higher education and professional work (Kalleberg 2011; McArthur 2011). Research within a variety of professional fields seems to support such concerns. Evidence indicates that neither pre-service professional education nor work place learning offer sufficient opportunities to learn about and practice complex moral and societal responsibilities (McKee and Eraut 2012; Nyström 2009b; Shulman 2009; Sugrue and Solbrekke 2011). It is argued that the moral and social dimension of professionalism is threatened by a tendency toward more individual 'self-realisation' (Bebeau and Monson 2012) or a 'utilitarian ethos'; an inclination to think of professional education primarily as a means of obtaining credentials that will be valuable for each individual on the labour market (Brint 1994). New forms of 'managerial' or high stakes accountability dominating the logic and current practices of New Public Management seem to have weakened moral responsibility (Cranston 2013; Green 2011; Solbrekke and Englund 2011) and expectations of what professionals 'should be', how they should perform, and what public responsibility they are expected to take on, are shifting (McKee and Eraut 2012; Sugrue and Solbrekke 2011).

Taking such a scenario seriously requires an investigation and discussion of what is expected of professionals today and how learning experiences from higher education and the transition to work life influence the formation of professional identities and notions of professional responsibility. Empirical evidence collected from the Journeymen research program provides examples of individuals' journeys through different cultural contexts. As will be elaborated below, these examples demonstrate how notions of professional identities and responsibilities are continuously (re)-negotiated. However, it is impossible to identify all the multiple forces and sources that influence professional formation within the confines of this chapter.

17.4 Professional Identity and Responsibility Formation – An Intertwined Process

Our assumption is that professional identity and conceptions of professional responsibility are the result of the interplay between individuals and collectives. The idea of active participation, negotiation as well as reflection, strongly suggests that internalisation of societal norms is a result of a dynamic process whereby the individual gradually comes to identify with the (possibly negotiated) enterprise of a community of practice (Wenger 1998, p. 295). The moral philosopher Larry May articulates it like this: "The idea of professional integrity or professional responsibility is intimately connected with the way a group of people comes to regard itself, and the way that society comes to regard that group" (May 1996, p. 109). Such a group-oriented perspective integrates personal, professional and wider societal norms – thus notions of professional responsibility are seen as part of the collective

and individual professional identities that are constructed and influenced by dominant social attitudes and norms and the respective profession's position and status in society (Solbrekke 2007).

While all workers are expected to be responsible, the groups we define as *professionals* are assigned public responsibilities and granted a specific status and levels of autonomy to deploy expertise in the interest of both individuals and societal interests (Freidson 2001). This ideal of 'collectivity-orientation' stems from the classical notion of professionalism (Durkheim 1957/2001; Parsons 1951, 1968), and implies the commitment to a body of knowledge and skills, both for the profession's own sake *and* for use in the service of individual clients and society. These purposes of professionalism have been reconceptualised as the moral and political obligations of professionals, and have been characterised as "social trustee professionalism" (Brint 1994), "civic professionalism" (Sullivan 2005), and "critical professionalism" (Barnett 2011). Such ideals may appear clear on an abstract level, but how they should be understood and lived out in practice is more complex and vague.

When Durkheim developed his ideas at the beginning of the twentieth century it was possible to speak of professionals as a more coherent group with distinctive social and moral values. In the twenty-first century, professionals are more varied and have more diversified and specialized expertise and roles (Brint 1994; Evetts 2006). Such circumstances lead to a variation of understandings regarding what a professional should be or do. However, current work conditions also imply constraints on professionals' lives and work that inevitably influence professional and personal decisions. No professional agent is free from multiple commitments and embedded responsibilities for not only clients' and societal needs, but also for science and the standards of one's profession and for professional colleagues, and they have to account to employers (Solbrekke 2007). Moreover, in the flow of rapidly expanding information technology and distribution of knowledge, boundaries between expert and novice have become less distinct, and lay people are encouraged to subject individual professional's actions to private as well as public 'scrutiny' (Castells 2000). The interests and desires of 'customers', clients, and patients increasingly influence what is considered 'best practice'. Contemporary realities of pluralism and relativism render moral positions contested and contestable, and to carry out work that is both excellent in quality and socially responsible is challenging (Gardner 2008).

While focusing on the professional, it is also necessary to be cognisant of the private sphere, with its domestic and family commitments, which may conflict with other professional responsibilities (May 1996; Nyström et al. 2008). Collectively, these multiple expectations of professionals result in a rather complex and 'messy' concept of professional responsibility, where dilemmas and conflicts are embedded in the inescapable tensions between responsibilities to clients, professional domain/discipline, society, employer, colleagues, family and/or friends, and one's own professional self and personal integrity (Sugrue and Solbrekke 2011, p. 22). As a society and individuals we expect professionals to be able to blend analytical and practical habits of mind, make decisions grounded in professional discretion that resemble what Aristotle called *phronesis*; situated judgements that result from reflective reasoning and deliberation (Sullivan 2005).

How, then, are students prepared to take on such demanding responsibilities? While it is readily recognised that much professional formation and learning is informal, incidental and dependent on previous learning and socialisation (Fishman et al. 2004), studies have proved the importance of the learning trajectories – the journeys individuals construct through formal professional education – and into work life (Hodkinson et al. 2004; Nyström 2009a, b; Solbrekke 2008; Solbrekke and Sugrue 2012). Abrandt Dahlgren et al. (2006) showed that students' ways of experiencing aspects of knowledge in their professional programmes, and their understandings of the knowledge relevant for professional work could be described in two contrasting conceptions. In the first conception, students viewed the knowledge learned as *ritual*, meaning that they could not see why or how the content they were learning in the program was connected to any professional work. In this category, the exchange value of knowledge was emphasised, certain things that just had to be learned, and got through in order to pass. The connection to a specific context or professional field of work was lacking.

In the second conception, the knowledge students were achieving in their study programme was seen as *rational* in relation to coming professional work. This means that the utility value of knowledge was emphasised, and connection to a specific field of knowledge or professional field of work was clear. This category also had two subcategories: students talking about substantive knowledge that is content specific and contextually situated, and also talking about generic skills that are transferable between different contexts. In an Australian research project, the Professional Entity project, focusing on similar topics, Reid and Petocz showed in a series of studies across a number of professional and classical liberal arts programs (e.g. music, law, design, mathematics, statistics) that students have varied conceptions of their coming professional work (c.f. Reid and Petocz 2003; Reid et al. 2008). These include an *extrinsic technical* conception of professional work as a group of technical components that can be utilised when the work situation requires it and an *extrinsic meaning* conception of professional work as focusing on developing the meaning ascribed to the objects handled by the professionals. The most developed conception of professional work is the *intrinsic meaning* conception, where professional work is seen as essentially related to a person's own personal and professional being.

Reid et al. (2011), also demonstrated that a rational substantive or generic conception of knowledge for the profession and an extrinsic meaning or intrinsic meaning conception of learning for professional work was strongly related to engagement with learning and formation of a professional identity. In a similar sense, a ritual understanding of knowledge for the profession combined with an extrinsic technical conception of learning for professional work was strongly related to a weak engagement in learning and a weak formation of professional identity. Abrandt Dahlgren et al. (2008) also emphasise that the different communities of higher education are of decisive importance for how the graduates become prepared for and identify with their future work, and what they perceive to be their responsibility as professionals. At stake therefore is the question of what identities and conceptions of professional responsibilities students develop through their journeys in higher education, and how these conceptions resonate with the identities they construe. To what extent do

these conceptions and identities correspond with what they encounter at work? What strategies do novice workers develop to cope with new commitments at work?

These questions will be discussed below from the perspective that learning is a complex formation process, and what it means to become and perform as a competent professional is socially and culturally contingent and may vary across contexts and time (McKee and Eraut 2012). We concur with socio-cultural stances that correspond with May's group-oriented perspective, advocating that identity and conceptions of professional responsibility evolve through engagement and negotiations of meaning in communities of practice (Billett and Pavlova 2005; Billett and Somerville 2004; Nyström et al. 2008) in the nexus of multi-membership in education, work and private (Giddens 1991; Lave and Wenger 1991; Shotter 1984; Wenger 1998; Wertsch 1991). Consistent with this reasoning, both a sense of self and conceptions of professional responsibility are understood to be a result of the dynamic consequences of the reciprocal interaction of personal and cultural factors in both their potentiating and constraining influences (Billett and Pavlova 2005).

The theoretical perspective we have applied to the realm of higher education means that students are seen as individuals as well as members of different disciplinary and professional cultures and degree courses. These degree courses may have a clear or less clear connection to a professional work life area, and may also have different educational arrangements. Patterns of relationships between higher education and work are here traced through the accounts of how students understand their education and coming professional work as they enter and as they leave their university education, how they see the coming work, and what they see as the relationship between study and work. In this regard, we draw on findings from a variety of programmes in psychology, political science, law, mechanical engineering and ICT engineering when discussing the impact of different institutional and pedagogical conditions in relation to the development of professional identities and responsibilities in the transition from higher education to work and over the first 3 years of professional work.

17.5 Tracing the Journeys from University to Professional Practice

Students' experiences of studying at university shape and change their life (Brennan and Teichler 2008) and also form their identities (Kaufman and Feldman 2004; Nyström 2009a). In this section, we follow similar lines of reasoning in theorizing on students' journeys from university and into work life over the first 3 years in professional practice. We will provide examples to demonstrate the complexity and diversity of how professional identities and professional responsibilities are formed and (re)negotiated through the experiences of education and work.

However, as journeymen through higher education, students encounter academic traditions and cultures, influenced by institutional and pedagogical conditions, which frame their educational journeys in different ways. Thus, before the discussion

on individual learning trajectories, we compare and discuss the variation in institutional and pedagogical conditions across contexts. By this we indicate how different educational designs might frame students learning trajectories.

17.5.1 Institutional and Pedagogical Conditions

The conclusions drawn from the comparative study involving four European countries, demonstrate that although the four universities deal with the same programme, they have a different emphasis depending on their learning organisation, and follow different pedagogies and conceptions of learning (Dahlgren et al. 2007). When contrasting the programmes in psychology and political science across the four universities these differences become clearly visible. The psychology programme offered at the University of Linköping (Sweden) applies methods of problem-based learning with a strong focus on confrontation with practical problems in the learning process. However, the psychology programme at the University of Gdansk (Polen) is mainly based on working with literature and theoretical reflections. The latter orientation also goes for the programme offered at the University of Duisburg- Essen (Germany). The psychology programme at the University of Oslo (Norway) is more in line with the Linköping programme by offering clinical studies, but does not follow a problem-based learning approach and builds on a linear relation between theory and practice (Karseth and Solbrekke 2006). The comparison of political science programmes shows that the students in all four institutions display a weak professional identity at the end of their studies. The content of the programmes is academic in its orientation and does not offer any strong professional profile. Taken together, the programmes, with the exception of the psychology programme at Linköping, provide students with a discipline-based identity.

Despite differences in institutional and pedagogical conditions, there are some features discernible across the four universities that refer to other distinctions. These are the differences between non-professional and professional programmes. In cases where notions of a professional role are developed, this seems to be accomplished during the later, sometimes more applied, elements of the programme. The institutional conditions seem to support the value of classical academic generic skills such as analytical and critical thinking identity (Dahlgren et al. 2007). A major aim of the Bologna process is to ensure the employability of the graduates, and the higher education institutions have been confronted with increasing international and national pressures to embrace changes to accomplish this. Nevertheless, higher education institutions do not always follow international and national precedents. The different institutions and departments have their own agendas too, and academic knowledge is still at the core when defining and legitimating educational programmes within the universities (Karseth and Solbrekke 2006).

Furthermore, how students and novices perceive the value of their education is highly dependent on the labour market. At the time the study was conducted the socio-political conditions and employment rates differed significantly between

the four countries. Furthermore, the perceptions of the students and graduates also reflect what we have labelled the “institutional pacts” between higher education and professional corporations or other stakeholders in the social environment of the university (Dahlgren et al. 2007; Karseth and Solbrekke 2006; Solbrekke and Karseth 2006). For instance, political science at the University of Oslo was established in order to educate professionals in public administration. An important aspect of this perspective was to establish a research-based theoretical education that aimed at educating reflective bureaucrats. We may argue that there still exists a “pact” between the educational institution and important stakeholders in the bureaucratic sphere. According to this pact, the educational institution is responsible for the theoretical formal knowledge base, and the work place is responsible for training the novices for concrete professional work (Solbrekke and Karseth 2006, p. 113).

So far, we have discussed the differences in institutional and pedagogical conditions that become discernible if we compare programmes between a sample of different universities. A reasonable assumption is that there is also a variation in pedagogical conditions between programmes within the same university. In the following, we will illustrate how that kind of variation can be described, using the data from Linköping as our focus for comparison between programmes.

When comparing programmes in psychology, political science and mechanical engineering, the trajectory from higher education to work life in terms of identity and knowledge formation can be described as a process of *continuity*, *discontinuity* or *transformation* (Abrandt Dahlgren et al. 2006), and these differences to a certain extent are linked to the structural and pedagogical conditions of the programme in question.

The psychology programme in Linköping was shown to have the most obvious professional focus and a high degree of continuity during the transition from being a student to being a professional novice. The socialisation and transition to work was immediate; when the novices showed evidence of professional skills in practice, this led to, in Wenger’s words (1998) a full legitimate participation in the professional community. The emphasis on contextualisation to the diverse field of psychology throughout the programme may be a feature of the educational design that contributes to the feeling of preparedness for work, as it is a strong feature of problem-based learning (Abrandt Dahlgren et al. 2005). In PBL programmes, the positive impact on graduates’ perceptions of communication, and generally on the feeling of preparedness for professional work, has previously been shown in the field of medical education (Jones et al. 2002; Antepohl et al. 2003; Willis et al. 2002).

The students in the Linköping political science program as well as in the mechanical engineering programme experienced the transition from higher education to work as a process involving some kind of *transformation or discontinuity*. In the case of the political science students, the transformation meant re-contextualising their general knowledge and generic skills to specific areas of work (Johansson et al. 2008). The mechanical engineering students experienced their journey into work life as a discontinuity. At the end of their studies they saw themselves in their future professional identity as being experts and belonging to an elite. As novice workers, their view of their professional identity changed since they saw themselves

as exchangeable, moveable project workers. The character of the working tasks as delimited parts of larger projects could be seen as the novices reaching what in Wenger's (1998) terminology could be described as peripheral legitimate participation in the professional community. There were also indications of engineering novices experiencing the professional programme in a more ritual sense, to achieve a formal legitimacy by passing the programme. Passing the program in that sense was seen as a marker of being able to learn fast and work hard, and thus functioned as a door opener to the labour market.

17.5.2 Journeymen Through University: Developing Academic Identities and Idealistic Understandings of Professional Responsibility

During the years spent in higher education, students' develop a strong identification with academic values, scientific knowledge and certain professions. Their perception of their future professional work will influence how they experience learning (Reid et al. 2008). The development of a professional identity is therefore intertwined with the perception of future responsibilities, and as our data illustrate, students have great expectations about what they will learn and become through their university studies. A freshman psychology student stresses that she, through her journey in higher education, will develop expert knowledge which implies membership of a particular professional group that has power. Power is seen as attached to expert knowledge and the specific trust accorded to professional groups by society: *"All experts have that sort of responsibility, because the moment you say you are an expert, you get a lot of trust. I think psychologists will be trusted a lot, although people really don't have any clue why. We have knowledge that very few people in society have, and consequently it becomes very easy to abuse the role. I think we have a great responsibility"* (Solbrekke and Karseth 2006, p. 108).

A law student emphasises an idealistic sense of professional responsibility and how he expects this to be an outcome of higher education. He expects to learn the moral purpose of higher education and the duty to use knowledge for the "good in society". Values like honesty and justice are highlighted: *"You should not look for the loopholes for the rich ones and defend the guilty ones. I guess a lot of people do that, but I will say that you have a moral responsibility not to exploit the system that you are privileged to have an insight into for the benefit of those who can pay"* (Solbrekke and Karseth 2006, p. 111). Similar views are expressed by the freshman political scientists as they see themselves as watchdogs for democracy (Johansson et al. 2008).

In general, the freshmen students start to develop a professional identity with the aspiration to dedicate their competence to the needs of others, as this statement from a student by the end of the studies illustrates: *"... It essentially means that you should apply your competence in the best interests of others, and that you must never act against moral, ethical and societal interests..."* (Solbrekke 2008, p. 492).

Typically, they are convinced that their professional trustworthiness depends on their ability to live up to the expectations of being ‘specialised experts’: “*As psychologists we enjoy much confidence from society related to solving a good deal of problems that other professional groups, so to speak, are not meant to cope with.*” (Solbrekke 2008, p. 491)

By the end of their studies, the notion of becoming an academically trained person has been reinforced in the students. They articulate a strong sense of academic identity, and value the knowledge they have learned and developed through their studies. No doubt, the years at university have given them new perspectives and understandings of themselves. They stress their advancement as human beings and also a change in the way they look upon life, since they have a new language and ability to be critical of the surrounding world. Adam, a political scientist, says: “*I have gained another understanding about knowledge itself, which has made me look upon life in a different way. It sounds pretentious but when I look at society, now I start to analyse*” (Nyström et al. 2008, p. 223).

Typically, the students see themselves as academically trained ‘experts’ that society needs. But having developed a scientifically based competence, they are also obliged to make their knowledge available in pursuit of a more humane society. A law student argues that there is a link between academic knowledge and societal responsibility: “*...because one is a well-educated individual with comprehensive training in how a system works and has to work for society to function.*” (Solbrekke and Sugrue 2012, p. 202).

Despite variations in learning outcomes contingent on different cultures and epistemic traditions in higher education (Dahlgren et al. 2007; Abrandt Dahlgren et al. 2006), a shared ‘formation outcome’ is that these journeymen have strengthened the sense of belonging to professional groups, with a strong reliance on scientific or academic knowledge as the ‘hallmark’ of their professional identity. While they all underline personal engagement and empathy as important ‘qualifications’, the need to be scientifically and analytically trustworthy seems to dominate their horizon. What happens, then, to their professional identity and conceptions of responsibility when moving from the theory-oriented training in communities of higher education to communities of work – when responsibility has to be lived out in practice?

17.5.3 Journeymen After a Year at Work: Re-negotiating Identities and Understandings of Professional Responsibility

Students’ transition from higher education will vary according to previous learning trajectories (McKee and Eraut 2012). What they all have in common though, is the fact that they start their journey into work life as newcomers who aim to move from a peripheral position in a community of practice to a more central position (Wenger 1998). The community of practice to which one belongs as a student is different and distinct from a community of practice where early career experience is acquired and

professional identity (re-)negotiated. It is through the negotiations between personal and socially derived imperatives that identity formation progresses throughout working lives, and what is seen as professionally responsible behaviour may change. This 'transition' represents a period where a new 'settlement' is sought, an identity dissonance that is re-settled, and re-negotiated. However, the force of the influence from the culture of their new work contexts will depend on the newcomers' position and motivation to engage in the practices and enterprise of the new community, and the extent to which they are willing to renegotiate their own conception of professional responsibility (Nyström 2009a; Solbrekke 2008).

A novice assistant attorney demonstrates how idealistic attitudes are renegotiated after a year at work. While she struggles to maintain what she sees as her morally and professionally defensible standards, simultaneously she begins to (re)negotiate her (pre)conception of professional responsibility as a consequence of participation in work practice. New commitments and contesting interests force her to wonder whether her values as a senior student were too idealistic: "*...I think that maybe my moral code was too high, I mean in a way unrealistic... I have to face the fact that the world is not such an ideal place and that you can't expect it to be one either.*" (Solbrekke 2008, p. 493). Commitments change in character when shifting the identity from student to professional.

As newcomers in a work context, by renegotiating what is seen as responsible behaviour, they also change notions of what is important to do as professionals – thus also renegotiating identities to 'fit' with the culture, repertoire and enterprise of their new communities of work practice. Henrik, a psychologist, can exemplify the negotiation between the spheres concerning what is 'correct' professional behaviour. He says: *... if you are at a party and there is a client there then you cannot behave in any way you like. I think it is hard... I haven't solved it yet, where the line is, but I don't think you can behave in any way you like* (Nyström 2009b, p. 10).

At this stage professional training implies developing an advanced and increasing ability to understand and handle the tasks of practice while also being able to behave in accordance with what is socially expected (Nyström et al. 2008; Shotter 1984). For some, as we have described previously, the transition can be experienced as smooth continuation of what has been experienced in the professional educational programme, such as in the case of many of the psychology students. They may experience affirmation of self-esteem and a sense of professional identity and responsibility based on their knowledge, but they may also experience that values and norms as a newcomer may be challenged or even contested in their new context of work. Hence the transition becomes more of a discontinuation or transformation of the learning outcomes of their professional programmes.

As novice workers, they have shifted from being prospective professionals with no responsibility, to being novice professionals with a heavy work load and responsibility for others. A clinical psychologist demonstrates a feeling of inadequacy when starting work in a place where she had successfully practiced as a student, and had thus been recruited: "*The responsibility was rather overwhelming: Now you are a psychologist and you are expected to know this, that and the other and be able to do various things, and it was rather difficult*" (Solbrekke 2008, p. 493).

The statement from this novice psychologist indicates that even well-educated students may experience severe changes in self-esteem when shifting from the communities of students to communities of workers. What she experiences is what theory suggests: that emerging professional identities are not stable when the character of commitments change. The shift from the role as a student, with limited responsibilities at work, to becoming fully responsible for all consequences of actions within a complex work situation, is more demanding than anticipated, even when tasks are stimulating and inspiring. What this statement additionally indicates is that professional identity formation is to some extent sequential: from a limited individual focus as a student to more relational and integrated ways of reasoning about one's profession as early career professionals (Nyström et al. 2008).

While focusing on the professional identity it is also important to take into account the personal and the private sphere, since commitments from these spheres can conflict with one's professional role (Nyström et al. 2008; Nyström 2009a; Solbrekke and Sugrue 2012). Collectively, these multiple expectations of professionals may result in dilemmas and conflicts as a consequence of the inescapable tensions between responsibilities to: clients, professional domain/discipline, society, employer, colleagues, family and/or friends, and one's own professional self and personal integrity (Barnett 2011; Nyström 2009b). Although all these dimensions of professional responsibility are not equally pressing for everyone, or at all stages in a professional's life and career (Fishman et al. 2004), our studies illustrate further how novice workers must handle a demanding life situation of living in a 'web of commitments'. Nyström's (2009b) study shows that this "web of commitments" yields different forms of professional identity formation over time, and that the relationships between the professional, the personal and the private spheres change. Our data indicate how novice workers are willing to 'postpone' their first choice career, and even avoid excessively demanding responsibilities when other commitments are pressing, such as this lawyer who chose to work in public administration with regulated work days for a period, although he hopes to become an attorney in the future. He says: *I have a daughter who is 8½ years old and I want to spend a lot of time with her... I have friends who have started to work as assistant attorneys and they work their heads off. ...I work regular hours from eight to four and then I go home* (Solbrekke 2008, p. 496). Such priorities do not necessarily mean ignorance of professional responsibilities. Rather, they suggest that it is necessary to understand professional responsibility in light of all the relationships that exist for a person, "...based on reasonable expectations of individual behaviour" (May 1996, p. 120).

It appears that the shift from the context of education to contexts of work, where novice workers encounter the realities of 'multiple responsibilities' and conflicts of interest in daily situations at work, causes them to renegotiate their (pre)conceptions of professional responsibility. It becomes apparent that the surroundings and culture of the local context significantly challenge the professional identities and conceptions they have developed through their journey in higher education. This makes it necessary to reach 'negotiated compromises' (Nyström et al. 2008), and compromising on one's moral stances or principles does not necessarily mean

that a professional acts irresponsibly (May 1996, p. 120). Rather, compromises are probably necessary in the context of plurality, insecurity and the need for flexibility, because making legitimate compromises implies the responsibility of taking into consideration the multiple conflicts of interest a professional is obliged to handle.

17.5.4 Journeymen After 3 Years at Work – Shifting Identities

After 3 years of work, the early career professionals are now full members of a professional community (Wenger 1998) and have developed an ability to handle the new ‘web of commitment’. They have now developed a strong sense of who they are as professional individuals, albeit in different ways and through different relationships between work identity and identity for activities (Billett and Pavlova 2005). When reflecting on their professional identity it is important to emphasise the role gender plays in how the female and male early career professionals construe themselves as professionals. Kristina, a psychologist, stresses “...*I think that I have to show that I’m skilled. I have a weak voice, I am quite small, and that is not something that we associate with competence, so first I have to show them that I know what I am doing.*” (Nyström 2010, p. 12). Studies of gender and professionalism point to inequalities in the extent to which females and males are viewed as competent and skilled (Kirpal 2004; O’Neil and Bilimoria 2005; Ranson 2003). It has also been suggested that these inequalities could lead to females and males occupying different occupational positions and responsibilities (Collinson and Hearn 1996; Mainero and Sullivan 2006; Teichler 2007a, b). Nyström (2010) found that female and male early career professionals acquire different kinds of legitimacy, which could, in turn, be derived from the gendered processes that exist in contemporary organizations. Another example of how ‘the web of commitment’ changes after 3 years in working life is the relationship between the different spheres of life, professional practice, and how the subjects constructed their gender identity (Nyström 2009a, 2010). After 3 years of professional work the early career professionals start to have other aspirations which influence their professional identity and also their thoughts about what is valuable in life. Niklas, a political scientist, argues “*I do not want to do it any more [referring to an international career]. The situation has changed as well as what kind of dreams and wishes I have./.../I’m getting married next summer...*” (Nyström 2009a, b, p. 13).

When the graduates reflect on the journey, and consider their professional trajectories from the last year in higher education to 3 years of professional work, the graduates’ visions and experiences reveal a shift from taking in new knowledge and making it their own, to a need to change direction and for some, do something different. One example is a psychologist who has worked professionally for 3 years, and when he thinks about the future he has ‘...*a hard time picturing myself here in five years. It is very hard.*’ (Nyström et al. 2008, p. 225). Another example of an early career professional in psychology envisioned himself starting on a professional

development course to become a psychotherapist in order to work with teenagers with eating disorders. This scenario depended on him continuing to work as a psychologist but *'then, sometimes, I just think I don't give a damn about all this. .. this thought is more diffuse but if I decide to get away from this, I think that I would like to work in design or interior design.'* (Nyström et al. 2008, p. 225). The graduates express a complex, dynamic and ever changing process of professional development that stands in contrast to the traditional vision of a more linear professional development (Baruch 2004).

Experiences of the journey toward becoming a professional and developing a professional identity over the first 3 years of professional work depend on educational background (Nyström 2009a, b). Nyström shows (ibid.) that the psychologists' professional trajectory was somewhat predefined by the discipline. They knew what profession they would enter and they were familiar with the professional practice, i.e. there was continuity between education and work (Abrandt Dahlgren et al. 2006). Nevertheless, after 3 years of work it seems that they were not fully prepared for their professional tasks and what the work as a psychologist would actually mean for them as individuals, e.g. the responsibility for their clients' mental health, or the stressful work environment. The political scientists, on the other hand, entered a program that did not prepare them for a specific professional role, which made their encounter stressful with the result that they had to transform and re-contextualise their knowledge (Abrandt Dahlgren et al. 2006; Nyström 2009a). On the other hand, after 3 years of employment they redefined their professional identity based on their new work practice and work tasks.

17.6 Conclusion

When drawing together the conclusions from our broad and varied studies in the realm of professional learning and the transition from higher education to work life, it is clear that professional learning can mean different things across nations, educational programmes and individuals. Our studies demonstrate that the interplay between national policy agendas, and disciplinary and professional traditions and practices has a profound impact on students' journeys from higher education to work life. Previous research on the transition from higher education to work life has provided important knowledge about the numbers of students who graduate and the patterns of certain career paths after graduation, but less research has focused on how the transition between education and work is played out through the trajectories of the students. The Journeymen project has, through its qualitative design of combining prospective and retrospective views on both education and work, provided a unique contribution to the knowledge of individual sense-making and understanding of socio-cultural conditions in the process of establishing professional identities and responsibilities for professional work. The ways students see the knowledge and learning that is needed for their future professional work

impacts on the way they identify with their profession and engage in their studies and learning.

From a disciplinary viewpoint, appropriate pedagogical approaches can allow the discipline profile to move from emphasizing ritual knowledge, to emphasizing rational substantive and rational generic knowledge. This can be achieved for instance, by specifying a curriculum that has numerous opportunities for addressing the rationale for including specific topics (particularly early in a course), for making explicit links to the profession, and for including the broadest and most transferable skills and knowledge.

We have also demonstrated that there is a link between institutional and pedagogical conditions and the patterns of transition from education to work. Dependent on different institutional and pedagogical conditions, the transition can be characterized as a process of continuity, discontinuity or transformation, in which the established professional identities and responsibilities are confirmed or re-negotiated. The studies reveal how formation of professional identity and understanding of responsibility as personal learning trajectories take form in on-going (re)negotiation(s) of identities and responsibility. When entering higher education and joining an educational programme, students not only become aware of a specific body of knowledge and skills, they are also initiated into the moral order of a profession by being exposed to communities of practice with particular sets of traditions, values and boundaries. Our findings indicate that students tend to learn and maintain a sort of 'idealistic' understanding of what they will do as professionals. However, what the studies also demonstrate is how the realities of contemporary professional lives thrust novice workers into situations that challenge the more idealistic professional responsibility. Assuming that professionally responsible behaviour is contingent on the professional's integrity and a profound understanding of the moral implications of his or her profession, it is appropriate to ask to what extent the 'academic capital' and ethical guidelines students develop and learn about in higher education are sufficient to cope with the shifting and complex commitments that work life represents.

There is a critical limit to how far personal stances, professional values and commitments may be (re)negotiated before they 'tip' towards 'illegitimate' compromises. Thus, without a moral awareness of the normative professional mandate there is a risk that what remains is 'compromised' compromises – and not results of *legitimate negotiations*. In order to avoid capitulation to a 'slide-rule' approach, both higher education and workplaces need to create learning spaces where the dilemmas of professional responsibility can be revisited on a regular basis. Particularly in a time of rapid change and powerful market forces, prospective professionals should be trained – in education as well as in on-going professional learning – to evaluate continuously and negotiate the core values of their professions and the implications of the unwritten contract with society. Professional learning implies deliberation, not to create harmony and consistency but as a way of representing pluralistic attitudes and conflicts of interests typical of modern work life. It is timely to point to the responsibility of higher education to offer space for discussions of legitimate negotiations and compromises and of what distinguishes such deliberations from illegitimate negotiations.

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Chapter 18

Integrating Professional Learning Experiences Across University and Practice Settings

Stephen Billett and Sarojni Choy

Abstract This chapter identifies and discusses the educational benefits of providing and integrating experiences in practice settings within tertiary education programs. It does so by adopting a broad curriculum perspective and focussing on developing the capacities required for effective professional practice. These capacities are now of growing importance as, in many countries with advanced industrial economies, higher education provisions are directed towards specific occupational outcomes. The provision and integration of practice-based experiences are seen as a way of securing that goal. Indeed, there are now growing expectations that higher education institutions will provide these experiences in preparing students who will be ready to proceed smoothly into their selected occupations upon graduation. A concern here is to identify an alignment between student experiences in educational institutions and those in practice-settings. This chapter explores ways in which these alignments can be considered and secured.

Keywords Integration of learning experiences • Higher education • Practice-based experiences • Work integrated learning • Professional education • Preparing students for work experiences

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18.1 Evolving Demands of Learning for the Professions in Higher Education

This chapter identifies and discusses ways to maximise the educational benefits of providing and integrating experiences in practice settings within tertiary education programs. It does so through adopting a broad curriculum perspective and focussing on developing the capacities required for effective professional practice. The goal of effective professional preparation is now of growing importance as, in many countries with advanced industrial economies, higher education provisions are directed towards specific occupational outcomes. Moreover, the provision and integration of practice-based experiences are seen as a way of securing that goal (Cooper et al. 2010). Indeed, there are now growing expectations that higher education institutions will provide these experiences in preparing students who will be ready to proceed smoothly into their selected occupations upon graduation. Rightly or wrongly, such outcomes are now commonly anticipated by students, industry and professional bodies, governments and organisations that employ graduates (Organisation for Economic Co-operation and Development 2010). Whilst such demands are problematic, contestable and described by some pejoratively as comprising higher vocational education, they represent a line of continuity that has long shaped higher education. That is, there has always been a strong alignment between higher education provisions and occupational outcomes (Roodhouse 2007), albeit either through their direct focus on the major professions or through so called liberal arts degrees that afforded somewhat explicit but no less successful pathways to well-paid occupations in the public service, clergy etc. However, in many countries this alignment is shaped by direct associations with specific occupations and with unprecedented quantum of students within mass higher education systems.

Together, these occupational specific requirements, the quantum of students and broadly based expectations about being ‘job-ready’ on graduation are making new demands upon higher education institutions, their curriculum provisions and teachers. They also comprise tough educational processes and goals for those who administer and teach in higher education institutions. In response to the specific occupational focus, a broadly adopted strategy is the provision and integration of experiences in the kinds of settings where the occupation for which students are being prepared is practiced. Although, there have been long-standing arrangements in some university courses for students to have practice-based experiences (e.g. for medicine, teaching and nursing), the scope, extent and expectations of and for these experiences are now growing to include all programs with an occupational specific outcome (Cooper et al. 2010). These experiences are no longer seen to be those where students merely practise and hone what they have learnt in university-based provisions. Instead, they are becoming a key element of higher education experiences and providing distinct kinds of contributions to students’ learning (Tynjälä et al. 2006).

As noted, this chapter discusses the provision and integration of work experiences for higher education students from a perspective that is broadly from curriculum

practice. That is the intended, enacted and experienced dimensions of curriculum and how these assist explicating and advising about the process of securing an integration of students' experiences in practice settings. As a consequence, in attempting to realise the popular, but tough educational goal of securing smooth transitions to practice upon graduation, it discusses how practice-based experiences might be effectively engaged with and integrated into higher education provisions. That is, their ability to generate in students the kinds of capacities required for initially engaging with some effect in their selected occupation where they secure employment and also to become effective learner-practitioners across their professional lives. So, there are goals associated with securing occupational, situational and life-long learning competence. Therefore, these competences comprise: (i) the canonical capacities required to practice the occupation, (ii) the requirements for that occupation to be applied effectively in the circumstance where graduates come to practice and (iii) those required by practitioners to be proactive, intentional and self-directed learners across their working lives.

So, beyond the specific requirements of occupational and situational preparation, is how to prepare students as active learners, rather than being reliant upon teaching by others. This third line of development captures much of what might be expected as an outcome of higher education. This consideration is also important because much of the effectiveness in the experiencing and integration of activities and interactions in practice settings is necessarily premised on how students elect to engage with them, including the intensity and direction of their engagement. These emphases direct educational intentions to how students are to be prepared and made ready to engage relatively independently in the activities and interactions that are afforded to them in practice settings. This includes them appraising and reconciling what they have experienced in relation to the intended outcome of their higher education programs. Consequently, it is both necessary and appropriate to focus upon students as active learners and how their learning might be promoted in both the practice and university settings. Considerations for curriculum, therefore, are not only about something that is intended by the educational institution and enacted both within the institution and practice settings (i.e. the intended and enacted curriculum), but also something experienced by students (i.e. the experienced curriculum). Therefore, in considering pedagogic practices, it is necessary to go beyond didactic instruction (i.e. teacher-led) and select approaches and models (Tynjälä et al. 2003) to focus upon learners' activities and how to include and utilise learning experiences occurring beyond and outside of teacherly engagements (Billett 2011). For instance, support within the practice setting and how students engage with pedagogically rich work activities become part of the considerations for enriching higher education students' learning experiences.

So, beyond contributions of the intended and enacted curriculum and pedagogic practices, are students' central roles in learning for their selected occupations and, subsequently, their ongoing development across working lives. This conception of experienced curriculum emphasises students' personal epistemologies, and how these are needed to be exercised intentionally and actively (i.e. agentially) and leading them to become effective and autonomous graduate practitioners in their

selected occupations. So, these epistemologies will do much to secure their capacities and direct their efforts to be effective learners across their lengthening working lives. Within the discussions here, the phrase learning refers to the change that arises through the continual process of experiencing through engaging in activities and interactions. When applied to individuals, the phrase development here refers to as the accumulated outcomes of the process of experiencing, titled ontogenetic development (Scribner 1985).

In advancing these premises, considerations for the integration of experiences are discussed here in making the case about how learning for specific occupational outcomes might best be developed initially and advanced further over time. One challenge here is that many existing educational accounts may not inform about or even encourage the use of experiences in practice settings, let alone how they might be effectively integrated into the higher education provision (Cooper et al. 2010). Hence, how concepts such as curriculum and pedagogy are understood need to be freshly defined and positioned as being part of, but in some ways distinct, from accounts provided through much of the education literature.

It follows, that the chapter continues from this introduction with considerations of the demands now being placed upon higher education provisions and the goals that need to be secured for effective occupational practice, including canonical occupational, situational and personal competencies. Having identified and outlined the educational goals that are planned to be achieved in programs seeking to develop the capacities required to move directly into occupational practice, the following sections in turn identify and discuss the kinds of curriculum and pedagogic practices that might be appropriate for such educational purposes. The chapter concludes with a set of suggestions about how the utilisation and integration of both sets of experiences needs to be advanced, appraised and utilised in distinct ways depending upon the particular discipline or occupation.

18.2 Mandate for Provision and Integration of Work-Based Experiences

As noted, governments and industries in countries with advanced industrial economies are demanding that university students are able to engage actively and productively in work activities upon graduation (Department of Innovation Universities and Skills 2008; Universities Australia 2008; Organisation for Economic Co-operation and Development (OECD) 2010). Also, these graduates need to be prepared in ways that make them able to effectively negotiate and manage their initial and ongoing participation in work and working life (Tynjälä et al. 2006), which ultimately extends to them being able to sustain their employability across lengthening working lives. This requirement for continuous learning across working life is salient because of the: (i) changing demands for occupations, (ii) ongoing transformation

of the needs of occupational practice, (iii) dynamic requirements of work practices, and (iv) need for developmental opportunities to move within and across occupations (Billett and Choy 2011). Learning to respond to these kinds of changes is now almost obligatory as few workers and even fewer occupations are immune from such changes. In many ways, these changes set out the mandate for the provision of and integration of practice-based experiences in higher education programs.

Certainly, there is a growing consensus amongst government, employers, professional and industry groups, students and many educators (OECD 2009, 2010), that learning experiences in educational settings alone will be insufficient for developing the kinds of capacities required for active and productive occupational practice (Griffiths and Guile 2003). Hence, there is growing interest in and use of work-based experiences as part of higher education provisions to: (i) augment what will and can be learnt in educational institutions, and (ii) find ways of effectively integrating experiences from practice settings to promote the kinds of learning required for effective professional practice (Cooper et al. 2010). Employee development in and through work is now increasingly seen by both public and private sector organisations as being central to their continuity and development (OECD 2010). Seemingly, these kinds of imperatives are serving to transform how workplaces are now viewed increasingly as valuable and legitimate learning environments. A growing interest in work-integrated learning has garnered attention and generated interest in gaining further understandings about how to conceptualise and work to effectively integrate these experiences for educational purposes (Tuomi-Grohn and Engestrom 2003). Regardless of these interests and demands, integration of practice-based experiences into the university curriculum serves only as a preliminary approach to preparing graduates as novice workers. Following this, they will need to become lifelong learners to respond to constant changes in work and occupational requirements. It may well be that engaging in work-based experiences may assist the development of this lifelong learning capacity. However, there are no guarantees that such integrations will secure either of these goals, as they are shaped by factors beyond the educational project.

As noted, there is nothing particularly new here. Practice based learning experiences have long been used in preparation for and the process of becoming a practitioner in the major professions (Tynjälä 2008). The internships in medicine, article clerkships within law, probationary periods in accountancy and teaching have served as preparatory and assessment for those seeking to enter those professions. However, now a far wider range of occupations are expecting and requiring that university graduates will have engaged in work experiences albeit for professional recognitions or licensing (e.g. engineering or midwifery) and be 'work-ready' upon graduation. Approaches to the provision of these experiences includes those referred to as co-operative education, work experience, placements, practicum, internships, field work, workplace projects, workplace research, work-based learning, sandwich years and cadetships, community-based learning and service-learning (Cooper et al. 2010). Common across these experiences are the periods of time spent in circumstances

where the occupational practices students are preparing for are being enacted. Yet, these approaches differ in terms of focus of activities (e.g. orientation to the world of work, specific occupational preparation), duration (e.g. short, long, day release), sequencing (e.g. before, in the middle or end of an educational program), and the degree of deliberate attempts to link these experiences into educational programs. Through these diverse arrangements, distinct educational goals, such as developing strategic, domain-specific and situational capacities, are aimed to be achieved, with personal qualities of being active, critical and reflexive sometimes being an intended learning outcome. Although many of these goals represent employers' and industries' aspirations for and expectations of graduates from higher education, they also reflect those anticipated by students who invest time and resources through participating in higher education, and whose expectations about outcomes are often quite personally strategic (Billett 2011). Their purposes include developing the procedural competence for selected occupations that will lead them to be effective when employed. In a growing number of countries, higher education students are experiencing increased costs or accruing debts associated with their studies. So, being employable upon graduation also has direct financial implications. Hence, for these reasons and those outlined above, the importance of students' personal epistemologies – i.e. those shaped by learners' beliefs, agency – mediate how they engage in learning related activities (Billett 2009b). This multitude of expectancies and requirements means that university programs are needing now to extend their provisions beyond existing institutionally provided experiences (e.g. tutorials and lectures in classrooms) to utilise and accommodate practice-based experiences in these students' programs (Cooper et al. 2010). Central here is integrating experiences and learning through university-based experiences into practice setting and vice-versa.

The case made here from a curriculum perspective is for this integration to be realised through the sequencing and organisation of learning experiences (i.e. vocational curriculum) as assisted by pedagogical practices – how these experiences can be enriched to assist and support opportunities available in both settings. Importantly, this integration needs to extend beyond those intended for immediate academic and work performance purposes to accommodate a critical and transformative perspective (i.e. not merely reproduction of routine work tasks) that may assist lifelong learning goals. Moreover, and as proposed, the efficacy of a curriculum for productive and purposeful educative experiences relies on the nature of engagement by students and their learning as the focus of the activity; duration; how it is arranged; who supports the learning at the worksite; and partnerships between the universities and workplaces. Given all of these imperatives, it makes sense to find ways of appraising and appreciating the educational worth of integrating work experiences in university curricula. However, it would be wrong to transitions to practice can be simply fulfilled through processes of integrating students' experiences alone, as factors outside the scope and influence of educational institutions. Nevertheless, the case proposed here is on the educational worth of integrating work experiences.

18.3 Educational Worth of Integrating Work Experiences

The belief that knowledge being produced and learnt in universities can then be applied directly to work activities and in workplaces is no longer sustainable as a principle for organising higher education provisions to be generative of occupational capacities. The broad situated cognition movement has emphasised the importance of setting, context and applicability, not the privileging of educational experiences and settings. Hager (2004) proposes that occupational practice is a lot messier than what can be presented outside of it. Work tasks and situations do not necessarily present clearly defined problems that can be addressed with the application of unitary conceptual explanations or ready-made solutions. This circumstance is largely because the goods/services requirements for and social practices in workplaces require and structure knowledge in distinct ways that often cannot be known about until they are engaged in and with. The diverse settings, in and across workplaces, offer a multiplicity of social and physical circumstances with disparate contingencies and bases for occupational performance (Billett 2001b). Moreover, while learning as reproduction of existing concepts and procedures is important for developing many occupational capacities (e.g. routine tasks, conforming to workplace standards), this approach may be inadequate for bringing about continuous improvement or novel or unfamiliar tasks.

Rooted within various analyses of changes in work and work practices and the requirements for active learning, there lies much promise in work-integrated learning as a means of achieving key goals of professional education. That is, beyond developing canonical occupational capacities (i.e. those required and expected of practitioners) that may be accessible through tertiary educational institutions these experiences offer the potential to extend knowledge and understandings for application in practice. This is also important given that the scope and dynamic qualities of canonical knowledge differs across occupations, hence presenting distinct challenges for professional education. For instance, future activities of surgeons may be subject to less change than information technologists who need to accommodate rapid developments in their occupational field.

However, Ellstrom (2001) cautions against easy and optimistic views about the efficacy of work integrated learning by questioning the concept of learning for 'integration' where some aspects may be defined and others indeterminate, expecting individuals "to use their own competence and to define and evaluate the task, methods, and results" (p. 423). He refers to two types of learning occurring in workplaces: adaptive and developmental, maintaining that these are not exclusive, but complementary. Creative learning is held to be the 'highest' level of learning, yet he notes that both reproductive and creative learning have places in work integrated learning. Aside from debates about conceptions of work integrated learning, Hager and Hodkinson (2009) also raise issues about what counts as transferable learning arising through such integrations. They hold that much of the learning curriculum is designed for learning as a product (acquisition of discrete items of knowledge or skills, Hager 2004, p. 3) instead of learning as a product and process that better

prepares learners for lifelong learning. However, such views may underestimate the active nature of learning through practice and that it is premised on procedural development alone, and a diluted appreciation of the experienced curriculum. Indeed, it is likely only to be those kinds of experiences that comprise lengthy periods in practice settings (e.g. apprenticeships, internships) where significant specific procedural development occurs.

Despite these considerations, much literature mirrors a widespread agreement that workplaces are rich, potent and authentic that affords a range of opportunities to learn. A body of empirical studies (e.g. by Eraut et al. 1998; Collin 2002; Fuller and Unwin 2004) attest to the potential of workplace experiences as productive learning, albeit with their particular attributes and any inherent limitations. Nevertheless, opportunities available to learners are not necessarily organised in educationally optimal ways for experiential or self-directed learning because the key imperatives for workplaces are on the services they provide and/or goods they produce (Tynjälä 2008). However, like any other social practice there is often also a realisation about the importance of continuity and change and the need for employees' learning and development in workplace settings. Yet, considered and informed ways of approaching and supporting interventions in work settings are necessary if tertiary students are to maximise their learning from work integrated learning. That is, more than just providing experiences in work settings they need to be augmented in some ways.

Learning experiences of all kinds can be made more effective through specific and targeted pedagogical interventions (Tynjälä et al. 2003) and those in workplaces are no exception. Many researchers concur that considerations of workplace learning extends beyond "simply individual, taught, self-directed learning, but that learning also includes formal, non-formal, informal and tacit aspects, experiential and incidental learning, reflective learning, legitimate peripheral participation, and learning "activity" (Sawchuk 2010, p. 369). These conceptions accentuate the multi-faceted phenomena of learning through work settings and grant variability to the broadly accepted concept of 'situated learning'; and that it leads to diverse sets of outcomes. However, the concept of situated learning is a salient consideration in understanding the educational worth of integrating learning in the university with that from work experiences. The contributions and influences of the socio-cultural environments in workplaces to knowledge construction suggest that a range of intentional and unintentional integration likely arise variably (Guile and Young 2003). Nonetheless, it may be appropriately designed and utilised curriculum and pedagogies that offer the best prospect of securing potentially rich, active and contextualised learning for students and workers alike, because these can be directed towards achieving outcomes beyond those realised through mere participation. It follows that approaches to integration require understanding the relations and contributions of personal and social interactions for learning, culturally developed occupational knowledge, and learning through practice.

Against a backdrop of these considerations there is emphasis on aligning the intentions of a university curriculum with the occupational and workplace cultures and discourses for the purposes of developing: (i) effective occupational practice,

(ii) occupational identity and (iii) capacities to be effective practitioner learners across professional life. According to Dewey (1933/1989), action (not theory) is the starting point for individuals' learning as they engage and interact with the contributions and suggestions of work environments and in doing so construct meanings, perform tasks, make assertions, solve problems and cooperate with others –all within the rules, values, attitudes and expectations of workplaces. Based on these premises, Svensson et al. (2004) conceptualise the integration of learning in universities and the workplace as the “intellectualisation of work associated with modern, integrated production systems” (p. 479) which demand increasing levels of theoretical knowledge and intellectual skills. However, effective occupation outcomes eventuate from a curriculum enacted in ways that invites individuals to construct what is valued for and by work. It includes them being able to negotiate what is referred to as the threshold transgression continuum between the workplace and the university (Davis et al. 2009), each supporting different forms of learning.

University based conceptions of curriculum as integration risk a tendency to be shaped by regulatory imperatives for structuring activities to integrate theory and practice for assessment, accreditation and compliance requirements (Guile and Young 2003). They are sometimes requested to learn and apply so called generic skills (e.g. communication, time management, professionalism and independence) in diverse situations and also take responsibility for their own learning. In these ways, students are being directed towards developing skills, behaviour and self-awareness associated with conceptions of work and self-development, often specified by government agencies and professional associations. Yet, these imperatives may be overstated. Instead, students need to learn to apply theoretical concepts in practice within different physical and social contexts where they were initially learnt. Experiences in the workplace form the main source of practical and tacit everyday knowledge and skills needed for professional competence. Paloniemi (2006) proposes work experiences are worthy because they contribute to three key areas of competence, namely:

- (i) practical skills and knowledge required in specific occupations and job-tasks.
- (ii) knowledge related to the work community and organisation.
- (iii) knowledge that helps one to assess one's work and ways of working and acting (pp. 443–444).

She holds that not all experiences necessarily contribute to specific occupational competence and differentiates those learning experiences in the social and physical context of work that contribute more to occupational development other than experiences in work tasks alone. Work tasks that are routine for individuals mainly contribute to individuals' development through reinforcing and honing what is known. Novel activities for individuals that were “not automated, involved conflict, and when followed by debriefing” (Paloniemi 2006, p. 446) are held to be more powerful in generating new learning. So, in quite different ways, these distinct kinds of activities lead to particular kinds of occupational development. However, it needs to be noted here that what constitutes novel or routine activities and learning is person dependant. What for one individual is a routine activity for another is quite novel. This is likely to be the case for students engaging in work integrated learning given

the increasingly diverse experiences they have before selecting their university courses (Newton et al. 2009). Nevertheless, unless the workplace community recognises, values and shares experience-based and tacit competence, individual learning may not be optimised. Therefore, considered and organised experiences for learners in workplace settings help maximise professional learning. However, workplaces, like educational institutions are not always benign and personal, and professional contestation and other organisational factors can shape the distribution of and bases for engaging in learning experiences in circumstances of practice (Bernhardt 1999).

Learning in practice settings also contributes to the development of students' occupational identity. It does this through assisting to achieve three purposes. First, it can develop capacities required for individuals to realise a preferred occupation which they assent to become their vocation (Dewey 1916). Second, it can provide experiences through which to develop the capacities to maintain competence and to remain employable (Field 2000), and, thirdly, it serves to engage individuals in a process through which they advance their occupational competence and attachment to it, or learn that it does not meet their needs and goals (Hodges 1998) and progress to a new one. Given that development of occupational identity is on-going, individuals need to know about workplaces as sites for learning because increasingly they have a responsibility for maintaining their occupational currency throughout working life and sustain identities that are congruent with what they know and reflect their sense of selves. Through these processes, the ongoing appropriation of domain-specific occupational conceptual, procedural and dispositional knowledge may arise. However, these processes are founded in a duality between the suggestion of the social world and individuals' engagement. Hence, beyond what workplaces afford learners, the process of appropriation and directing human intentionality to achieve both the initial and ongoing learning is premised in learners' agency, enactment and intentions. It is learners who select what, when and how to learn and construct meanings. Hence, those organising intentional learning experiences (i.e. curriculum developers and teachers) should mindfully include activities that develop and engage learners' personal epistemologies (as proposed by scholars such as Brookfield 1997; Marsick 1988; Simon et al. 1991). This is because, ultimately, it is the interactions amongst curriculum, pedagogy, and personal epistemologies that lead to learning that is effective for particular social and physical circumstances. This meaningfulness is mediated by those who engage with and learn through and from them. Such interactions can be generative of capacities that are personally purposive and socially aligned to occupational practices – making it worthy for individuals as well as work.

The case made here is that the interface of university curriculum with the workplace can pose challenges for university programs, teachers and students as well as workplaces in organising rich learning opportunities. Not only the curriculum, but pedagogies that complement learning at the two sites also need careful consideration and selection to effectively secure the contributions of authentic (practice) settings and experiences. At the outset, an understanding of the educational worth of providing and integrating experiences for effective occupational practice offers some direction towards this goal. For instance, nine learning outcomes of work

integrated learning are proposed by (Eraut 2004) as justification for their efficacy. These comprise: (i) learning about task performance; (ii) gaining awareness and understanding; (iii) experiencing personal development; (iv) engaging in team work; (v) participating through role performance; (vi) acquiring academic knowledge and skills; (vii) learning about distinct ways of decision making; (viii) problem solving; and (ix) making judgements. More recently, Coll et al. (2008) have extended this listing to include learning that provides opportunities for students to prepare for the 'real world', realise personal achievements, and network (i.e. interact) at work. Whereas Eraut's outcomes focus at the task performance level, Billett's (2011) list includes emphases on: (i) learning about the occupation, (ii) about variation of the occupation, (iii) extending knowledge, (iv) gaining orientation, (v) building capacities, (vi) developing occupational specific forms of knowledge, and (vii) meeting requirements for licensing. Together, or on their own, these kinds of frames point to the potential scope of learning in and through work activities and interactions.

The prospects that work integrated learning experiences will translate to a smooth transition for graduates into professional practice are widely anticipated. However, Eraut (2004) alludes to a range of traditional, cultural and structural legacies that shape the local nuances of the workplace and these take time to identify and understand. It is through opportunities to engage in work based experiences that these kinds of nuances can be experienced and understood. Given that learning of this kind comprises an inter-psychological process (i.e. between individuals and social sources of knowledge) this engagement with the social world through both close personal interactions as Vygotsky (1978) and others (e.g. Rogoff 1995) propose, and more distally through observing, listening and imitation (i.e. mimesis) seems essentials. These understandings have expanded the repertoire of pedagogical approaches to facilitating learning in the workplace. However, these embellishments draw on discipline based teaching and learning. Lee and Roth (2006) claim that many ethnographic studies have either been too context specific or too broad, and are too descriptive to advance broader advice about such matters. Furthermore, the findings of such studies are often interpreted from the perspective of the researchers themselves (the analysts' paradox).

So, knowing more about the what, how and who is useful to understand the pedagogical strengths and affordances (invitational opportunities) in the workplace that provide platforms to organise and enact a curriculum that offers purposeful experiences for students. The provisions that reproduce occupational capacities should not progress at the expense of developing "the kinds of critical capacities" that contemporary workers require (p. 828). This is consistent with accounts on process of meaning-making through experience as the initial catalyst for intentional learning (Merriam et al. 2007). All of these concerns suggest a greater focus on the development of students as lifelong learners who are critical and adaptive in their practice and can actively engage in the constant remaking of social and cultural practices shaping changes in the knowledge required for particular work practices. These are the types of outcomes that likely will appeal to workers, enterprises and governments and prompt their engagement.

This wide ranging rationale for the educational worth of work-integrated learning experiences endorses the need for curriculum and pedagogic practices that can utilise and augment the provision of work-based experiences and establish bases for supporting graduates' ongoing learning across working life as necessitated by constantly transforming occupational and work requirements. In sum, to realise the educational worth of providing and integrating experiences in both workplaces and university settings, necessitates careful alignment amongst pedagogic, curriculum and personal initiatives so they are generative of the combinations of capacities that enable learners (i.e. students and those working) to become active agents, participants, contributors and co-constructors of knowledge in work environments. It is, therefore, important to constructively align the curriculum and design of appropriate pedagogies within the context in which learners utilise their knowledge and skills (Lynch et al. 2006) because work experiences are becoming an integral and primary element of the higher education curriculum.

18.4 Alignment of Curriculum and Pedagogic Practices for Work Integrated Learning

The case presented above favouring the efficacy of learning in practice settings includes a consistent conclusion that curriculum and pedagogic practices for work integrated learning are required, because just have work-based experiences alone will be insufficient. Instead, students need to engage in goal-directed activities and interactions in ways mediated by workplace experiences and then be integrated or reconciled with other experiences they bring to their university studies. Through these processes arises the prospect that the abstracted knowledge gained from university experiences and the situationally embedded experiences can be reconciled and mediated by learners to develop personal domains of knowledge that are adaptable, and form habits of adaptiveness of the kind that are likely to be successful in accommodating these changes (Vosniadou et al. 2002). Indeed, it is these imperatives that shape consideration of how the intended, enacted and experienced curriculum might be ordered through higher education provisions.

However, before discussing these considerations, some definitional matters need to be addressed. Curriculum is seen as the provision, organisation and sequencing of experiences albeit in educational or practice settings. This definition derives directly from the origin of the term, which refers to the pathway to progress along or the course to follow. That is, a set of experiences intended to secure kinds of intended learning. As noted, there is the intended curriculum, what is supposed to occur and what learning is held to be acquired. The enacted curriculum is what actually happens when it is implemented, as shaped by the range of situational factors, including the teachers, capacities, interests, etc. Pedagogies are held to be means of enriching or augmenting these learning experiences. This enrichment can arise through teacherly acts in educational institutions or practice settings (e.g. explanations, guidance, modelling) or through engagement in activities that

are particularly rich learning experiences or engagement with artefacts and objects that are generative of rich learning. These underpin the experienced curriculum – what learners experiences.

18.4.1 Curriculum for Integration

The intended curriculum arrangements supporting the provision and integration of practice-based experiences needs to take into account the kinds of capacities that need to be learnt and also the means of securing those capacities. Indeed, the origins of the word ‘curriculum’ refer to the course to follow or track to progress along, which incites consideration of the journey (i.e. process) as it does outcomes (i.e. the destination). So, there is a need to consider processes of learning as well as intended learning outcomes. For instance, the provision of experiences for students undertaking the same course may need to be of different kinds. The pathway of experiences for students who are new to the occupation would need to be different to those who are familiar with it. For example, although experienced enrolled nurses engage in the same nurse education program as school leavers, the readiness and familiarity with the work of nursing and hospital wards across these two cohorts may be quite distinct. The enrolled nurses are already familiar with and have been immersed in the health care work and settings, and as nursing assistants. Hence, their work integrating learning experiences would be more helpfully focussed on augmenting and extending what they already know. However, for the school leavers, these experiences are likely required to develop initial understandings of nursing work and orientations to the kinds of physical and social settings in which it occurs (Newton et al. 2011). So, for these cohorts of learners, an appropriate intended curriculum needs to focus on developing further the foundations of the occupations upon which their occupational practices are premised. Yet, even here there are likely to be variations as enrolled nurses have diverse sets of experiences and direct entry students sometimes have a range of related experiences (Newton et al. 2009).

Therefore, although much consideration is given to the intended learning outcomes the intended curriculum needs to highlight and make accessible the kinds of capacities or knowledge that need to be learnt, including that which is hard to learn through practice (e.g. resulting from new discoveries and understandings), and knowledge that is complex, yet in different ways for different kinds of students. However, having clear intended outcomes or goals for the learning is important for guiding selection and integration of experiences. Based on cognitive accounts of what constitutes expertise, it is proposed that the capacities for effective occupational performance are premised on three types of knowledge to organise the kinds of experiences to secure appropriate kinds of outcomes. These are:

- (i) domain-specific conceptual or declarative knowledge (e.g. Concepts, facts, propositions and the links between these) (Anderson 1982; Glaser 1984). These can easily be learnt from books, texts, different forms of media and artefacts.

- (ii) domain-specific procedural knowledge (Anderson 1982; Shuell 1990; Sun et al. 2001). Its acquisition involves active participation in a range of activities and rehearsal until the task can be completed without conscious thought.
- (iii) dispositional knowledge (e.g. interests, beliefs). Individual's interests and beliefs moderate and shape the type, intensity and degree of involvement in experiences presented in the workplace (Billett 2001a).

Each of these forms of knowledge is richly interconnected and interdependent with each other and their effectiveness arises through episodes of practice that offer opportunities for their deployment and development through work activities. Each type of knowledge captures aspects of situational pertinence and is appropriated and remade by and for particular practice settings. Raelin (2008) explains this in terms of distributed systems of appropriation, where knowledge is developed and mediated within social, cultural, political, and ethical frameworks. Hence, workplaces provide physical and social contexts for learners to transform and construct canonical occupational as well as more situational capacities including socially pertinent conceptions, procedures and dispositions. Within the diverse and 'fluid' contexts of practice settings, the challenge for those who organise curriculum is to arrange experiences, including their form and duration through which learners can access and develop these three types of knowledge and in ways that permit them to meet performance requirements of their occupations and learn something of the situational variations in that practice, not just for now, but also the future.

Acquisition of knowledge that is demanding to be learnt or difficult to access may require particular educational or pedagogical interventions to make it explicit for comprehension, application and reconstruction of new knowledge. As referred to later, particular pedagogic strategies and provisions that can assist these learners are required to secure this kind of knowledge. Hence, combinations of appropriate curriculum and pedagogic practices might be used to provide access to and connect particular forms of these three kinds of knowledge that may not be otherwise learnt within the boundaries of everyday experience in the university or practice setting. For instance, opportunities to be involved in work tasks that generate instances for learning and demand the conciliation and consideration of a range of knowledge types. Whether referring to patient care, completing a project based activity in the workplace, taking a task across a range of work areas or planning a semester's teaching exemplify activities of this kind. Hence, opportunities to access these kinds of experiences and their sequencing become part of the organisation of the curriculum.

Regardless of the knowledge to be learnt, engagement in work experiences offer perhaps the single greatest source of accessing work-related knowledge, and therefore is central for curriculum endeavours associated with work integrated learning. Billett's (2001a) investigations found that learning through everyday work activities and interactions in a range of occupations arose in reasonably consistent ways, and these offer useful bases for the organisation of a work integrated learning curriculum. He explains that the efficacy of learning through everyday work experiences arises from four key affordances (invitational qualities for individuals to construct

work-related knowledge). These are noteworthy: (i) engaging in authentic work tasks (both routine and non-routine); (ii) access to indirect guidance (e.g. observation and learning); (iii) access to direct guidance (i.e. by more experienced workers); and (iv) provision of opportunities to practice (i.e. to rehearse, refine and secure development of the kind where tasks can be completed without resort to conscious thinking and that allowing causal associations to be developed). Experiences in practice settings are helpful for developing a range of procedural, dispositional and conceptual capacities yet particular intentional learning experiences are required to make that knowledge visible and accessible. Such experiences can also expedite specific links to individuals' practice and their readiness to act in effective ways. Nonetheless, a purposeful curriculum for work integrated learning relies on the learners' agency and the intentions of those who have the skills, knowledge and time to advance learning (e.g. more experienced workers, supervisors, clinical preceptors). For instance, others in the workplace, such as colleagues, supervisors and mentors, through experience or intuition (or both) may identify opportunities where they could act or intervene to assist, guide or comment on activities for those less experienced.

There is also a growing understanding that different kinds of experiences and, indeed, settings are generative of particular forms of knowledge, suggesting that curriculum and pedagogic consideration need to be informed by clear statements of educational intentions. For instance, certain pedagogic strategies might be required for making knowledge that is inaccessible or hard to learn accessible (e.g. explanations, analogies, diagrams). The particular kinds of heuristics might be used to assist practitioners remember something. For instance, medical doctors are advised to remember particular conditions by the patient who first encountered them (e.g. remember Mr Smith) or a celebrity who had that condition (Sinclair 1997). The point here is that these pedagogic practices need to be introduced at certain times (e.g. before or during practicums, or clinical experiences). Hence, useful integration relies on the selection of workplace pedagogies, best suited to achieve relevant outcomes and their inclusion at specific points on the curriculum.

Furthermore, the provision of experiences needs also to take into account the limitations of learning through practice and developing contingencies. Limitations such as: (i) developing bad habits and dangerous practices (e.g. inappropriate short cuts); (ii) no opportunities to practice or learn from mistakes; (iii) absence of support and guidance; (iv) performing tasks without fully understanding the purpose; and (v) performing tasks that did not contribute to the development of vocational identity have been identified in studies of work related learning (Billett 2001a). These limitations can be minimised through appropriate pedagogical approaches to optimise the strengths of learning from experiences in practice settings. Therefore, important curriculum decisions need to be made to organise experiences to accommodate these contributions and limitations. This qualification that authentic experiences may need explicit structuring and sequencing emphasises that it is not sufficient just to provide work-based provisions. Instead, just like any other element of students' learning experiences a curriculum for work integrated learning requires careful structuring and enactment.

In sum, curriculum considerations for providing and integrating work based experiences needs to go beyond the mere provisions of such experiences. Instead, the intended curriculum needs to planfully consider the kinds, duration and sequencing of experiences in practice setting and how those experiences need to be augmented by specific pedagogic practices. As foreshadowed in the considerations above, specific pedagogic strategies that support and augment a work integrated learning curriculum are required. These strategies emphasise the important role to be played by more informed partners, co-workers, clinical supervisors etc. in these educational provisions. They can permit individuals to draw upon their experiences and expertise in practice settings and augment the activities and interactions that comprise those set out for the learners.

18.4.2 Pedagogies for Integration

As argued earlier, workplaces are potentially rich in their contributions to support occupationally aligned learning. But to optimise that potential, particularly in the integration of experiences may require engaging with the pedagogic opportunities of workplaces. This becomes important because while workplaces are widely recognised as powerful sites for professional and vocational learning, where individuals construct and negotiate their work identities, and learn about their self and agency at work (Etelapelto 2008), learning at work is not necessarily perceived as learning, nor are workplaces always positioned to optimise the learning potential (Eraut 2008). Yet, the source of competence for work principally resides in the workplace (Collin and Tynjala 2003), as per the theories of expertise (Etelapelto 1998). Paloniemi (2006) similarly maintains that “experience gained in authentic work practices is a prerequisite for competence construction and for the development of expertise” (p. 440). Other findings by Tikkanen and Kujala (2000) and Paloniemi (2004) propose the role of work experiences as a way of developing competence, especially for those competences that cannot be developed in educational institutions, other than personal characteristics and more formal training.

Importantly, selective use of the pedagogical tools available in the workplace can augment and extend learning in particular ways, and this needs to form an important consideration for the enacted curriculum. These pedagogies have wide-ranging significance for work integrated learning because the socio-cultural experiences in practice settings shape interpretations, meaning schemes and knowledge formation. Such experiences may be difficult to replicate in other or substitute environments (Symes and McIntyre 2000). While curriculum designers may suggest appropriate pedagogical strategies in the workplace, it is the learners themselves who need to decide what is most appropriate and navigate through the environment to secure opportunities. Hence it becomes necessary for students to become aware of the efficacies of workplace pedagogies in contributing to learning in different ways, and how they can engage with them, not just for academics studies but also lifelong learning. A set of seven dimensions proposed by Billett (2002), that students might

use comprise: (i) daily work practices; (ii) coaching; (iii) other workers (co-workers, supervisors, guides, technical experts); (iv) questioning; (v) observing and listening to others; (vi) modelling; and (vii) workplace document and procedures as means through which workplace learning experiences can be enhanced. Of these, modelling and coaching, supplemented with questioning, explanations and the use of diagrams are useful guided learning strategies for developing procedural and conceptual capacities, respectively. Each of the seven elements and ways they contribute to learning is briefly discussed below.

- (i) *Daily work practices* allow learners to apply their knowledge and skills, and practise the same tasks until those tasks can be done without recourse – from a conscious to unconscious phase. Practising daily work activities also gives an opportunity to learn from mistakes and enhances the ability to solve problems and increase confidence. Students need to understand the requirements of job tasks and also know the types of knowledge and skills required to perform the tasks effectively. Careful planning, actively accessing opportunities and then reflecting on their performance will allow them to optimise learning through daily practices and continue to refine performance.
- (ii) *Coaching* shows the correct method of performing tasks. The workplace coach/guide is seen to have expertise to provide support, correct mistakes and listen to learners' issues or concerns. Coaching approaches instil confidence and also present challenges. However, students' agency in seeking clarification through questioning for instance is important to gain greater benefits from coaching.
- (iii) *Other workers (co-workers, supervisors, guides, technical experts)* share their knowledge base, and exchange knowledge and experiences, enabling individuals to learn about different ideas and perspectives. Co-workers provide technical and moral support. As individuals openly share their experiences and receive confirmations of correct procedures and approaches, they augment their levels of confidence. To experience the benefits of learning from co-workers students need to actively seek space with colleagues within and across the socio-cultural groups. It is they who have to initiate frequent conversations and interactions, and engage in active listening/observations.
- (iv) *Questioning* is a strategy that provides quick answers to learn about the way things are done, and how problems are generally solved in the workplace. Questioning also clarifies things for better understanding, but hinges on appropriate questioning techniques and general etiquette.
- (v) *Observing and listening* assists in learning how to perform a task or solve problems using the correct and accepted procedures. Individuals learn new ways of solving problems, acquire new information and access experienced workers' knowledge. Active observation and listening offers opportunities to gain a systems level understanding of the workplace. Particular nuances, discourses, codes of behaviour, and cultural practices of specific workplaces are acquired through careful observation and listening. These strategies also contribute to the development of tacit knowledge.

- (vi) *Modelling* is when tasks are performed by experts and learners observe and build mental models of the task and gain an understanding of the requirements for performance. Through this strategy models of practice that demonstrate the correct way of solving problems are learnt.
- (vii) *Workplace document procedures* provide the prescribed ways and standards for practice and may also help learners understand how their roles and tasks relate to the overall business of the organisation. This strategy relies on self-directed learning by the students who may not necessarily have the opportunity or time to read the procedures during work.

Beyond this listing of workplace pedagogic practices are those associated with storytelling (Jordan 1989), half-worked tasks (Makovichy 2010), and heuristics, such as mnemonics and devices such as associating a particular medical condition with the name of the first patient it was encountered (Sinclair 1997) and also what (Bailey et al. 2004) refer to as identifying teachable moments arising from workplace activities.

While some of these pedagogic practices are consonant with university-based activities, their efficacy in the workplace may vary. For instance, everyday activities, observing and listening, and other workers form significant sources of learning through practice, but the richness of learning may be determined by a range of socio-cultural and other factors. Then, having access to particular kinds of workplace experiences that provide teachable moments is also crucial. An example here is doctors and nurses' handovers in hospital wards, teachers planning a semester of work, or tasks associated with diagnosing a problem and developing a solution. Yet, in structured educational experiences there is the use of learning circles and focus group activities or co-op seminars (Grubb and Badway 1998) that provide opportunities for students to share their experiences and engage in critical reflection about them.

In sum, intentional pedagogic events and activities such as those mentioned here need to be structured, organised and enacted in ways that are directed towards appropriate and intended learning outcomes. Doing this can augment learning provided through practice-based experiences and promote the development of capacities that will not arise through discovery alone. Nonetheless, the learning activities need to focus on learning rather than on teaching and also offer genuine spaces for learning in workplaces where productive outcomes take precedence over learning.

18.4.3 Learner Agency

The provision of practice-based experiences and pedagogies to augment learning experiences in both settings forms the foundation of universities' work integrated provisions. Yet, the enactment of both the curriculum and the kinds of pedagogic strategies referred to above will not be effective without the readiness, directed engagement and agency of students. Their interest in and capacity to independently integrate learning experiences afforded by the educational institution and the

practice settings form the foundation for successful integration. As the key agents in the integration of learning in university and workplace settings, students need the appropriate skills, attitudes and willingness to engage in ways that can optimise the benefits of work related experiences. This engagement extends to their interests in and abilities to reconcile experiences in both of these settings, thereby integrate their respective contributions to learning and development. Four elements appear critical here. First, the interest in and capability to gain new procedural, conceptual and dispositional capacities through work experiences. Second, taking an active role in and responsibility for their learning whilst contributing to workplace tasks because work and learning co-occur. However, there is a cost to learning and development when individuals prioritise work in favour of studies. Combining work and studies is challenging, yet critical according to Svensson et al. (2004). Third, is the need to recognise that different work sites offer particular developmental and transformative opportunities, making it necessary to plan and engage students in diverse work experiences to gain maximum benefits, even through processes of sharing those experiences. Finally, students need to appreciate the significant role of being introspective about the outcomes of their work and learning experiences, hence the need to be pro-active in improving learning. Teachers can promote agency by increasing opportunities for individual and collective reflection, extending the notion of reflective learning and self-directed learning (Raelin 2000, 2007). Essentially, more specific student preparation is required for work integrated learning to be optimal.

Hence, beyond a consideration of curriculum and pedagogic practices are the personal epistemological practices of students and the need for these to be exercised agentially when engaging in and learning from and across the range of experiences that comprise their higher education. Together, these three sets of considerations come into play when educational efforts to promote effective work integrated learning are enacted. There is one other important reason why learners need to be active and agentic, and self-directed in their learning related activities in workplace settings. Workplaces are contested spaces, essentially a domain for existing workers who feel more entitled to access learning opportunities (Billett and Pavlova 2005). Hence, mere peripheral participation by students will limit the scope of learning. While learning opportunities are present and available in most workplace settings, access to these may be influenced by a range of workplace factors such as cliques, affiliations, gender, race, language or employment standing and status (Bernhardt 1999; Darrah 1996; Hull 1997). Hence, provisions in the workplace may be contested and students need to know how to negotiate and manage on-site affordances.

18.5 Preparing for Work Integrated Learning

The preparation for effective work integrated learning extends to developing students' capacities to be active and effective in their engagement in both educational and workplace settings. Learning about diverse instances of practice, synthesising what

is common and distinct about each place and experience will expose new possibilities and potential for application/adaptation in current as well as future circumstances. But this will only arise if they engage effortfully in such activities and the knowledge gained may extend the repertoire of students' experiences in work integrated learning and give better understanding of expected practices when they venture outside practice settings to gain other preparatory experiences. It will further develop their agency to become intentionally active learners in preparation for future employment in different practice settings across their working lives.

So, curriculum and a range of appropriate pedagogic practices (planned and unplanned) for work integrated learning offer the prospect for learners to enrich and extend their existing knowledge, access and learn knowledge that would be otherwise inaccessible to them in practice settings alone, and certify what is learnt. Notwithstanding these potential, Merriam and Clark (1993a, b) hold that unless the experiences are valued by learners, this potential will never be fully realised. Therefore, pedagogical practices need to be appropriately enacted to augment past and current experiences to extend students' learning as directed towards their university courses and being prepared for effective occupational practice including securing any required professional certification. Tennant and McMullen (2008) similarly assert the importance of this, acknowledging that contemporary graduates need to be multi-skilled and adaptable to – “quickly and willingly apply existing knowledge and skills to new situations, and ... be prepared and capable of engaging in new learning as circumstances warrant” (p. 522). They need to increasingly rely on their learning skills to continually update knowledge and skills, primarily through experiences in practice settings to utilise work itself as the curriculum. Furthermore, they need the skills to access and actively engage with the affordances in the workplace. These contentions suggest that enactment of any integrated curriculum needs to focus on the learners as the constructors of knowledge, because it is they who learn and those who teach should remind themselves that educational provisions are nothing more or less than an invitation to change (Billett 2011). This point was posed by Tennant and McMullen (2008) who asserted that learning in the workplace necessitates dispositions to adapt and respond to changes in circumstances, and that such dispositions are premised on the “ability to reflexively engage with workplace problems and issues which involves critically reflecting on oneself as a learner and worker” (p. 259). Competent and proficient workers are expected to perform routine tasks without having to consciously think about their actions. This emphasises the importance of learning in ways and through means that can integrate conceptual, procedural and dispositional knowledge to achieve particular goals in given situations. The connection between these dimensions of knowledge extends beyond the *techné* (technical capacity) to carry out a task requiring learners' skills to critically review situations and draw on past and current knowledge and experiences to respond appropriately. Brookfield (1997), Marsick (1988), Simon, Dippo and Schenke (1991) and Giddens (1991), among others, have long proposed this type of orientation, maintaining that such a goal is not impossible because learning is an on-going process.

Ellstrom (2001) suggests there are five key factors that influence integration of learning and work and form important considerations for planning and preparing for such outcomes. These are: (i) the learning potential of the task; (ii) opportunities for feedback, evaluation, and reflection on the outcomes of work actions; (iii) the formalisation of work processes; (iv) employee participation in handling problems and developing work processes; and (v) learning resources (p. 425). Eraut's (2008) typology that includes work processes with learning as a by-product; learning activities located within work or learning processes; and learning processes at or near the workplace (p. 149) makes students aware of the wide range of learning modes will also influence the quality of learning.

Notwithstanding the theoretical and practical efficacies of a well conceptualised and designed work integrated curriculum with a range of appropriate pedagogies, as discussed, learners need to be adequately prepared for the integration of university and workplace learning. This is because university students are well schooled in academic tasks (Tennant and McMullen 2008) and use work integrated learning opportunities to extend what is learnt in the university and make judgements about the efficacy and relevance of the educational provision before applying these in meaningful ways to suit different workplace contexts. Worker-learners undertaking university studies, on the other hand, may be more familiar with work practices and seek experiences in educational programs to enrich and extend their occupational or workplace knowledge. Many of these learners, such as the enrolled nurses mentioned earlier, may have weaker educational foundations to learn wholly new forms of knowledge. The integration of their practice based experiences into the university curriculum enables them to do this. Overall, proactivity and agency is equally important for both groups of students to support rich learning as well as professional practice. Regardless of the two groups, it becomes necessary to prepare students as agentic learners who can perform well in practice settings.

18.6 Developing Capacities for Integrating Experiences

As argued above, there is a need to develop students' capacities to effectively integrate or reconcile their experiences and learning from work settings. Although strategies for learning in universities may improve the ability to assimilate learning in the workplace (Svensson et al. 2004), learning episodes may need to be organised to promote students' skills for engaging effectively in practice experiences and maximising their learning from those experiences, including how they reconcile such experiences in terms of the knowledge they need to learn for their selected occupational practice. Tennant (2000) and Major (2005) contend that academic learning skills, while appropriate to the requirements of writing assignments, are less applicable to learning in the workplace where students' roles in the process and management of learning becomes more salient. Tennant (2000) goes on to suggest supplementary skills that complement traditional academic learning and are

essential for effective transition to work. These are: analysing work experiences; learning from others; functioning with incomplete information; contemplating multiple courses of action to decide on the most appropriate action at a given moment; learning about organizational cultures and sub-cultures; expanding learning opportunities by using a range of resources and activities; and understanding various competing interests in the profession.

While these skills are highly desirable, they cannot be guaranteed to arise through mere participation. Instead, the preparation of graduates for work integrated learning experiences may warrant particular kinds of interventions before, during and after the learning episode. Drawing on the findings of twenty projects associated with the provision and integration of practice based experiences, Billett (2009a) suggests a series of curriculum and pedagogic activities before, during and after learning in the workplace as a starting point for effective integration of experiences in university and practice settings. These are summarised below.

18.6.1 Before Practice-Based Experiences

These days it is common for students to have experienced some learning in workplaces in preparation for and when engaged in part-time employment, mainly to manage fee debt. However, this does not necessarily mean they are fully aware of the educational worth of workplace experiences. Three questions posed by Eraut (2004) form the premise for student briefing before practice based experiences. There are: (i) What are students expected to learning for practice based experiences? (ii) How is learning expected to take place? and (iii) What factors will influence learning? For more purposeful learning to meet academic requirements and lifelong learning, it is helpful to orientate students to the requirements for effective engagement at the worksite, establish bases for experiences, and develop capacities for work performance. Clarifying purposes and expectations of work performance will better inform them about roles and responsibilities of the different agents and ways they can operate as agentic learners. Furthermore, an appreciation of the socio-cultural settings and their significance to learning and work in practice settings will help students understand the cultural traditions and structural legacies that shape and may even disfigure practice. Billett's (2006) research concluded that different forms of social practices influence how knowledge is appropriated and structured. Appropriation is also effected by industry or worksite specific jargons that students need to learn. Additionally, because learning involves others, forming and maintaining quality relationships for learning is also time consuming. They need to become aware of competing and varied interests of workers and managements, contested resources and opportunities and as 'outsiders' learn ways to navigate through challenges to access and secure learning. Appropriate personal attributes such as communication skills, expected behaviours, attitudes or dispositions towards work will be highly valuable too. On the whole, preparing students before practice needs to concentrate on how learning occurs in the workplace and their roles in enhancing learning (Tennant and McMullen 2008).

18.6.2 During Practice-Based Experiences

Students need to be mindful that the daily goals of workplaces focus more on productivity and services than on learning, and that workers and supervisors are often preoccupied with their daily duties and targets. However, when opportunities arise it is necessary for students to seek and access direct guidance by more experienced workers and actively engage in pedagogically rich work activities and interactions. Sometimes newcomers to the workplace can also offer rich understandings about the contexts (Eraut 2008) because they have recent experiences in exploring and making sense of the socio-cultural nuances. Learning requires sequencing and combining activities from the prescribed learning curriculum and practice-based curriculum by effectively interacting with peers, and actively and purposefully engaging in learning in the workplace. In terms of assessing how to approach a particular work-learning situation, Ellstrom (2001) advises learners to ascertain how well the tasks, methods or results are prescribed and to what level of detail. These, he explains, influences the type of learning – reproductive, productive or creative.

18.6.3 After Practice-Based Experiences

The personal benefits of work integrated learning have been widely reported as contributing to ‘greater self-awareness, self-confidence, self-belief, and improved task, project, and time management skills (Coll et al. 2008, p. 114). Practice based experiences also reaffirm the value of theoretical knowledge and how academic studies lead to career preparation. These and other benefits need to be shared and critically analysed to explicitly link what is learnt in the two sites as well connect any new knowledge to what students have experienced. The active and selective qualities of learning that is valued by individuals can be emphasised to then generate critical perspectives on learning and work. However, Goldman (2008, p. 105) cautions that these tasks take time and ‘is hard work’.

The development of critical and reflective thinking skills before, during and after each learning episode is also advocated by others. Lakes (1994) argues that critical and reflective thinking skills are important for appraising changes in work requirements, technologies and practices to ascertain their worth and applicability. Knights and Willmott (2000) also contend that these skills are necessary because critical insights arise through experiences other than in educational settings. Essentially, critical and reflective thinking skills need to be embedded in interventions before, during and after the learning episodes in practice settings.

It is proposed here that appropriate interventions before, during and after learning episodes in practice settings can minimise surprises and facilitate enjoyable and productive experiences. Smooth transitions to effective professional practice are expected to be enacted by graduates who are informed, prepared and have capacities for professional practice, including critical insights and personal agency (Billett 2009a, b). This preparation includes preparing students to be proactive learners, capable of exercising critical, but productive agentic learning. However, there are

other intervening factors that influence these outcomes. Learners' past knowledge and experiences, what is valued as worthy knowledge at the time, what is afforded by the learning environment, and access to relevant discourses will all shape how they engage in activities and interact in educational or practice settings. Regardless of all these, it is the quality of experiences and how the learner engages in them that determine the degree of success. Hence, curriculum decisions need to consider combinations of affordances and engagement that can generate robust and critical occupational knowledge.

Finally, learner agency underpins the quality of engagement. The skills for life-long learning to integrate learning from different sources serve well the necessities to engage in learning in the workplace either as a new graduate or as a worker-learner engaged in continuing education and training. Nevertheless, personal epistemologies and their place within the curriculum and supporting pedagogies also play a critical role in their engagement, and, hence, learning. In sum, the success of integrating university and workplace learning relies on how well the students are informed and prepared, as well as their personal epistemologies and agency. Three approaches to make pedagogy, curriculum and personal epistemologies are proposed by Billett (2009a, b) as potentially helpful. These are:

- (a) identify and acknowledge the pedagogic potential of practice experiences, and consider how these can be engaged and integrated within higher education curricula to maximise students' learning experiences;
- (b) include within curriculum considerations about how best to prepare for, position, sequence and identify the most appropriate duration of practice experiences, and consider support for learning from those practice experiences; and
- (c) identify what kinds of experiences might best develop, sustain and utilise students' personal epistemologies, including their critical engagement and reflection (p. 840).

These propositions highlight the importance of universities' roles in developing students as proactive learners, capable of exercising critical, but productive, agentic learning and development.

18.7 Advancing Integration of Learning Experiences Across University and Practice Settings

In conclusion, the integration of learning experiences between the two sites and students effective reconciliation of those experiences are not without challenges. They rely heavily on the partnership between universities and setting where students engage in practice-based experiences (i.e. workplaces). These partnerships necessitate negotiations to balance the interests of the universities in facilitating and maintaining learning experiences required for course curriculum, and productivity and workforce development imperatives of workplaces where students can engage in experiencing their occupation in action. Necessarily, both partners need to be involved, by degree, in the designing, delivery, assessment and review of learning, and be committed to student learning, although it will likely always be the case that

education institutions will carry by far the greatest portion of this burden, and quite rightly. To expect otherwise is to court failure. Indeed, there is much that universities can do in terms of their provision of experiences and finding ways of elaborating those experiences. As has been proposed above, many of the goals for higher education that are related to effectively preparing graduates to move smoothly into practice are associated with the provision of practice-based experiences. Much is being undertaken to now provide such experiences. But, the provision of such experiences is the commencement point, not an endpoint. Instead, as argued here there is a need to organise, sequence and structure those experiences to generate the kinds of knowledge that need to be learnt. Yet, to do this requires the identification, selection and enactment of pedagogic practices that can augment that learning. As noted particular kinds of augmentation are required and these can be located in the strategies used by teachers and others before, during and after practice-based experiences as well as particular kinds of work experiences that are inherently pedagogically rich. Then, there is the need to assist students become active and intentional learners as they will need to learn independently or interdependently in the workplace, and thereby develop capacities that will assist them across their working lives. It is this collection of practices that are educationally sound, adroit and relevant for contemporary higher education that have been introduced and discussed across this chapter.

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Chapter 19

Transitions to Working Life: Securing Professional Competence

Päivi Tynjälä and Jennifer M. Newton

Abstract This chapter examines the transition from education to work as a critical phase of professional career and the development of professional competence. Literature on transition to working life has brought up several challenges that many graduates meet in early stages of their career such as threat of unemployment, inadequate knowledge and skills, decreased self-efficacy and increased stress, instability of professional identity, early attrition and changing occupation, newcomers' role and position in a work community, and the importance of workplace learning. This chapter examines each of these challenges from the professional competence point of view. Special attention is paid to the role of social partnerships in meeting the challenges.

Keywords School-to-work transitions • Professional competence • Partnerships • Challenges of newly graduated • Youth unemployment

19.1 Introduction

This chapter examines the transition from education to work as a critical phase of professional career and the development of professional competence. Literature on transition to working life has identified several challenges that many graduates meet in the early stages of their career such as: threat of unemployment, inadequate knowledge

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and skills, decreased self-efficacy and increased stress, instability of professional identity, newcomers' role and position in a work community, early attrition and changing occupation. The importance of workplace learning in supporting graduates as they transit to the workplace is influential in assisting graduates deal with these challenges. This chapter examines each of these challenges from the professional competence point of view drawing upon examples from several research projects undertaken by the authors to accentuate how these challenges might be addressed. In particular special attention is paid to the role of social partnerships in meeting the challenges.

Most of the studies pertaining to school-to-work transition have focused on the employment of newly qualified people (e.g. Teichler 2007; Betti et al. 2005). Comparisons between transition practices across countries have revealed substantial differences in how they provide workplaces for youth. However, qualitative analyses on circumstances beyond the cold figures are rarer. One exception is Guile's (2009) conceptual analysis in which he argues that the transition from education to work should be thoroughly rethought. According to him the transition should be understood as the development of vocational practice rather than acquisition of qualifications. This follows that the conceptions of vocational practice need rethinking as well and seeing vocational practice as "evolutionary, laterally-branching and envisioning". In other words, vocational practice in this view involves creating new practices and objects as well as modifying and developing existing practices; and workplace pedagogies are central to these processes. This kind of conceptualizing of vocational practice entails the idea of vocational development as a continuum starting from education and continuing throughout one's working life, involving both vertical and horizontal transitions and transformations. It also entails the idea that transitions are not only individual phases of development, but also junctions that link individual and institutional processes (see Volanen 2012).

The conceptualization of transitions to working life as the development of vocational practice and as junctions of individual and institutional processes, in turn, suggests a paradigm change in how the transitions are enacted. Two different approaches can be discerned in this respect: *an individualistic approach* that relies on developing individual attributes that help in transition (e.g. training career adaptability, Koen et al. 2012; or "newcomer socialization", Saks and Gruman 2011) and *an institutional approach* which is based on building social partnerships between education and work (e.g. Billett and Seddon 2004; Deitmer and Heinemann 2009). In this chapter, our main focus is on the latter. In some vocational education and training systems partnerships between education and work have a long history. A well-known example is German dual VET system where industry and education sector jointly take care of apprenticeship training. In many other countries, VET partnerships have been developed only recently and are organized in a less structured way. For example, in Finland students' workplace learning is organized within the framework of national and local agreements between the education and industry partners. In recent years, there has been increasing interest in social partnerships across higher education institutions internationally to ensure that university graduates have the ability to make smooth transitions to into professional practice (Billett and Henderson 2011).

In the following sections, we examine the transition to working life from the professional competence point of view. We discuss the challenges of the threat of unemployment, inadequate knowledge and skills, decreased self-efficacy, instability of professional identity, newcomers' role and position in a work community, and the importance of workplace learning (cf. Tynjälä and Heikkinen 2011). The specific role of social partnerships in relation to each of the challenges is discussed drawing upon, where relevant, empirical evidence from several research projects in the field of healthcare to provide insights into how the above challenges can be addressed. We argue that the role of social partnerships is central to understanding and responding to transitions issues. In particular, the presence of pedagogical arrangements with strongly aligned education and practice experiences seems essential.

19.2 Challenges in School-to-Work Transitions

19.2.1 *Threat of Unemployment*

A study by Betti et al. (2005) describes school-to-work transition in EU countries by analyzing the employment situation of individuals as a function of the time elapsed since the person's most recent exit from education or training in relation to the current employment situation. Their findings show big differences between the countries in overall employment situation and for the newly graduated in particular. The countries where the overall employment situation is poor (Spain, Italy, Greece) the disadvantage of the newly qualified group tends to be accentuated. During 2012, media reports indicated the unemployment rate of Spain being above 25 % and more than half of young people being out of work. In general, the probability of unemployment seems to decrease as the level of education increases (e.g. OECD 2000; Woolbers 2000; see also Teichler 2007). However, in recent years the unemployment also among highly educated has been increasing in many countries (e.g. Moreau and Leathwood 2006; Livanos 2010). Therefore, the threat of not getting a job after schooling may be true not only for low-skilled workers, but also for highly educated (Vuorinen-Lampila and Stenström 2012). Indeed, recently in Australia there has been considerable concern raised from nursing's professional and union organisations that newly degree qualified nurses have been unable to secure employment in a graduate program with a health care organisation (White 2013). This has significant employment implications for these new nurses as many non-graduate nursing positions advertised require a registered nurse who has a minimum of 12 months experience. Thus gaining a university qualification may, into today's competing workforce not necessarily guarantee a successful transition from school to work and it would appear that this might be influenced by unemployment rates. Betti et al.'s study (2005) showed that there are differences amongst countries in how the unemployment rate varies across education levels. For instance, Austria and Finland were characterized with high index of the overall employment situation of "juniors" (i.e. persons with the exit-from-school-to-observation interval of up to 5 years), and the employment situation was quite equitable for persons with

different levels of education/training. By contrast, in the UK and Ireland, also characterized by good overall employment situation of juniors, there were marked differences based on levels of education/training, meaning that the employment situation for poorly educated was much worse than for the better educated.

As noted above, here we discuss the challenges of school-to-work transition from the partnership point of view. From this perspective, the employment situation becomes a very interesting case and the following question arises: Are there differences in employment rates between the countries with or without dual system in vocational and professional education and training? In other words, is the employment situation of young people better in the countries where vocational students are employed in apprentice-type agreements during their education and training? This consideration is founded on the kinds of preparatory programs that include significant components of workplace. According to Betti et al.'s (2005) study there was no clear-cut relationship between the type of vocational school system and the employment outcome. In European Union statistics (European Union 2012), the lowest level of youth unemployment rates were found in the Netherlands, Germany and Austria of which the latter two have dual VET-system. (The lowest youth unemployment rate in Europe is in Switzerland, but it was not included in the statistics because it is not the EU member state.) In OECD statistics from 2011 (OECD 2012), the lowest unemployment rates among young people were in Switzerland, Netherlands, Japan, Austria and Germany. Thus, among the top performing five EU member states, the dominating vocational training type is based on the dual system in three countries, and on a school-based system in two countries. The reason for the inconclusive findings may lie in the fact that there may be functional social partnerships also in these countries with the school-based VET-system. For example, in the Netherlands, there is a widespread use of work-based learning. Outside of the EU, within Australia for example, the VET system is informed by industry and is client-focused to deliver flexible, relevant and responsive education and training. Similarly in Finland, a work-based learning system was introduced as part of school-based vocational education and training at the beginning of the Millennium, with positive effects on vocational school graduates' employment (Tynjälä et al. 2006a). Although the phenomenon in question is complex in nature with complicated interrelationships between educational and labour market systems as well as societal conditions, the findings of their review suggest that close collaboration between vocational schools and workplaces is conducive to effective post-school transitions that lead to employment. The mechanisms behind this probably lie in the fact that partnerships provide students and employers with an interface to meet each other and thus make smooth transitions possible.

19.2.2 Inadequate Knowledge and Skills

When young people are facing the challenge of finding a job, they also often have a feeling that their education has failed to prepare them with adequate skills and knowledge for the working life (e.g. Crebert et al. 2004; Murtonen et al. 2008; Stenström 2006; Teichler 2007). For example, in a Finnish study university

graduates after 2–10 years of work experience were asked where they had learnt the skills they required in their job. Of the respondents (n=955) 66 % thought that they had learnt the most important skills at work and only 14 % mentioned university as the learning site of these skills (Tynjälä et al. 2006b). Research on newly qualified health professionals also clearly demonstrates graduates' concerns about a sense of lack of preparedness for the demands of their professional role. In a study by Newton and McKenna (2007) examining newly qualified nurses' experiences of their first few months in practice, participants reported lacking appropriate knowledge and skills. Thus, when they began their graduate program they did not feel prepared. Olivia, a new graduate nurse, illustrates this point well,

Now I understand that I was not very prepared, I knew that I could probably get through the day. I could get patients showered and meds [medications to patients] given but if anything had gone wrong I don't think that I was prepared for any little hitch in my day.

This sense of unpreparedness, generates a lack of confidence in the graduate's competence in managing the reality of everyday practice as Cathy, another graduate, stated:

Clinically I don't think that I felt ready...when you're out there doing it with very sick patients...very hard to um ... be prepared for that.

Research on doctors' transition from student to newly qualified doctor and transitions from generalist to specialist clinical practice highlights the complex kinds of learning that occurs in the reality of everyday practice as the novice acquires the competence to manage difficult and complex situations (Zukas and Kilminster 2012). To an extent, these feelings of inadequate competence in early phases of a career can be seen as a natural phase of professional development. Studies of expertise have consistently shown that the development from a novice to an expert takes about 10 years (Feltovich et al. 2006). Keeping this in mind, it is not reasonable to expect that newly qualified employees would have high level expertise right in the beginning of their career. Rather, the slow development of expertise combined with the rapid change in society and the world of work suggest pursuit of the kind of professional development models that are based on the idea of continuum from initial professional training towards lifelong continuous professional development. From the education point of view, a worthwhile question related to skill development is what kind of educational practices are associated with expected learning outcomes. As the relationship between learning outcomes and their predictors is highly complicated there are only a few studies that have tackled this question. In a survey of more than 1,200 Dutch graduates by Vaatstra and Vries (2007) it was reported that graduates from highly activating learning environments (such as problem-based learning and project learning) attributed more generic and reflective competences to themselves than graduates from conventional learning environments. The findings also showed that learning ability, analytic competences, working independently and working in a team positively contributed to the development of competences in the later careers of graduates. As regards vocational education and training, Virtanen et al. (2014) examined factors predicting vocational students' learning outcomes during their workplace learning periods. The largest explanatory factor was the active membership. The more students reported that they were able to

function as active members of their workplace (i.e. having the possibility to influence the way things were done at the workplace, with regular workers asking their opinion and advice and possibly learning from them) the higher they evaluated their skills learning and professional identity development. The second biggest factor explaining students' learning outcomes was the integration of experiences between school learning and workplace learning. This is an element of educational practices and it describes, at a very concrete level, the connection between the students' two different learning environments, the school and the workplace. The closer the students held the integration between school and workplace learning to be, the better were their (self-assessed) learning outcomes. The integration factors included variables describing features of integrative pedagogy (e.g. Tynjälä 2008; Tynjälä and Gijbels 2012) such as discussing workplace learning situations at school, learning tasks from school to work, and applying knowledge learnt at school at work. The integration factors also contained variables referring to connective model of work experience described by Guile and Griffiths (2001).

Critical then to ensuring students perceiving they possess the necessary competences to function in their impending professional role is the pedagogical approaches utilized to foster the integration between the two learning environments, of school and the workplace. As a component of a larger project exploring preparation for practice for healthcare professional students, Newton (2011) examined how to enhance this integration between university studies and the clinical workplace with a group of final year undergraduate nursing students through a facilitated reflective learning group. Six students over a period of 7 months met monthly and were encouraged to identify their own action points at the end of each learning group that would then be revisited the next time they met. The intent behind this was to encourage the students to develop a sense of personal empowerment and foster reflexivity and agency. Fenwick (2013, p. 364) argues that education needs to "attune professionals to the multiple and complex nature of transitions – the shape of their personal transitional experience(s) in terms of the assemblages or practice, regulations, work arrangement, knowledge cultures in which their experience is unfolding". Certainly, this was the educational process that the students in Newton's (2011) study experienced. The reflective learning group allowed for consideration of multiple perspectives of practice issues that students would not have necessarily undertaken without this guidance as they prepared for their transition to their professional role. The learning group provided a space in which the students were able to explore and challenge their previously held values and assumptions about professional practice, organizational cultures and demands, and expectations. This space enabled the students to consider how to work more independently and to recognize that they were not expected to 'know everything'. This is illustrated through Donna, a third-year nursing student, who shared the following insight:

Realizing that I do know stuff, which I didn't think I did, I just think it's a confidence thing and having the support from the University is really important ... because I've had this wonderful start to this year, I'd be much more able to cope next time I think...

Through the sharing and drawing out experiences, the students perceived a reduction in fearfulness of being regarded as not having adequate knowledge if they asked others for advice. The reflective learning group provided a pedagogical process

to develop the students' capacity to be better prepared for facing problems and simultaneously working out how to resolve problems or issues at the time. The students gained an awareness of how to create learning opportunities when working in clinical practice alongside a registered nurse, acknowledging how to indicate where their level of competence was at, as illustrated in the following quote:

I think it's okay to, tell the preceptor [a registered nurse] this is where I think I'm at and, and this is the level that I think I can perform to and then you know, that might be above what that preceptor thinks that I'm at, but they don't know me, so, but, if you tell them then, then they don't expect too little or too much.

During the 7 months, as the students engaged in both university studies and clinical workplace practice, the students gained confidence that enabled their skills and theoretical knowledge to be refined into understandings about actual nursing practices as they learned how nurses might behave in the workplace- enabling integration of these views into a personalised model of professional practice. The students' evaluation of participation in the reflective learning group highlighted that participation had given them 'a voice' and that they felt more prepared and empowered for the transition to professional practice.

The studies above suggest that for the development of skills needed at work it is important to design learning environments where students actively engage in problem solving and integrate theoretical and practical knowledge. Thus, educational practices such as problem-based learning, project studies, integration of work-based and school-based learning, and other types of work-related learning and activated instruction are arguably conducive to development of working life skills, and hence as Newton's study evidenced may decrease feelings of inadequate knowledge and skills. Especially important here is to arrange students' possibilities to participate in authentic work communities and environments. As Filstad and McManus (2011, pp. 763, 777) state, "what is the most important for newcomers is how they become knowledgeable as they recognize that it is not their educational knowledge, but working out how to engage and participate in the social practices, that counts" ... Newcomers "find that their 'theoretical knowledge' is not the most important" but that access to social-cultural knowledge, that is, norms, values, rules and regulations – organizational culture – is vital. Indeed research on graduate nurses' transition to the workplace (Newton and McKenna 2007; Newton et al. 2009) highlights this impact quite clearly, as the novice nurse finds learning to 'fit in' to the workplace a critical element of their transition to clinical practice. Thus, the role of partnerships between education and work seem to be significant not only from the employment point of view but also from the competences point of view.

19.2.3 Decreased Self-Efficacy and Stress

Transitions from one phase of life to another are always considered involving the source of possible stress (Salmela-Aro 2012). The causes of stress of newcomers seem to be quite similar to what is typically found in older workers, such as social stressors, cooperation problems and quantitative overload (e.g. Grebner et al. 2004).

In particular, in professional fields involving high personal input, quickly changing situations, and socially and psychologically challenging relationships, the early career experiences may be psychologically and socially overwhelming. For example, in the field of nursing Duchscher (2009) has described *transition shock* as the experience of moving from the known role of a student to a less familiar role of professionally practicing nurse. Typical of this experience is a contrast between the relationships, roles, responsibilities, knowledge, and performance expectations required within the academic environment to those required in professional practice setting. The transition shock involves emotional, physical, socio-cultural, socio-developmental, and intellectual aspects. Emotionally, it manifests itself as extreme sensitivities, seeking validation and reassurance, fears of failure and incompetence, and so on. Physically, it may cause exhaustion, sleeplessness, poor nutrition and lack of exercise, for example. Socio-developmental aspects include role uncertainty, inadequate guidance and intergenerational dynamics (Newton et al. 2009); and intellectual aspects are related, among other things, to incongruences between theory and practice, lack of knowledge on transition, limited practical knowledge, and professional role-relations immaturity. In a current study being undertaken by Newton and colleagues on workplace learning in nursing in Australia, these aspects of incongruences are illustrated by a new graduate, Pink who was 6 months into her first year as a qualified nurse, reported:

I feel quite daunted and really questioning yourself and what you've learnt... you realize you rely on your senior staff a lot more than you thought you would and really there is still so much to learn.... Since becoming a graduate I see things I'm not sure about and I have to go back to the theory to look it up....I'm still observing other people learning how to do things and seeing what they're doing and I might try that next time....I'm sort of still learning my way around things and so my autonomy is not there yet ... It feels so surreal having to supervise a student; it's such a strange feeling... Sometimes I feel I shouldn't have to supervise a student, some days it's like the student and I have to sort of navigate it together.

Similarly to nursing, the early phase of teachers' career is often characterized by lowered professional self-confidence and self-efficacy as well as stress and burnout symptoms. For example, in their study Woolfolk Hoy and Burke Spero (2005) observed significant increases in self-efficacy during student teaching but significant declines during the first year of professional teaching. In a study among university teachers by Postareff et al. (2007, 2008), it was found that teaching-related self-efficacy among teachers who had taken few pedagogical courses was lower than among teachers who did not have pedagogical training at all. Those who had acquired more pedagogical training reported highest self-efficacy scores. Fives and her colleagues (2007) found that stress symptoms (which they called "burnout") increased and self-efficacy decreased during the first teaching practice period among student teachers, but in the long run significant increases in self-efficacy and decreases in stress symptoms were found. On the basis of these findings, it can be assumed that in the first phases of pedagogical training and teaching career teachers become aware of their personal weaknesses or learning needs, leading to decrease in self-confidence and self-efficacy. Along with the increase of experience over the years, self-efficacy expectations increase as well.

The findings described above suggest that in the early phases of professional career, in any field requiring high level expertise, there is a clear need for support systems. In the fields such as teaching and medicine there is a long tradition of mentoring being used as a support system for newcomers. Fives et al. (2007) found that student teachers experiencing high levels of guidance reported higher levels of self-efficacy for instructional practices than did those who reported less guidance. Similarly, studies on the relationship between mentoring and stress at the workplace suggest that close interaction between the younger colleague and the mentor has a potential of decreasing stress and increasing self-confidence (Thomas and Lankau 2009; see also Aspfors et al. 2012).

As to mentoring and related support systems, the role for partnerships can provide an avenue for reducing the stressors of decreased self-efficacy and increased stress as students' transitions to their professional role and workplace. For example, in Finland there is a nationwide network for organizing mentor training, peer-group mentoring, and other forms of teacher induction support (<http://www.osaavaverme.fi/eng>). The network is coordinated by the Finnish Institute of Educational Research by the University of Jyväskylä, and the members include all teacher education units in Finland. Furthermore, among other stakeholders, national teachers' organization, Trade Union of Education in Finland, and national employers' organization, representing the biggest employer group of teachers, Local Government Employers, are active participants of the network. Within these collaborative partnerships it has been possible to develop and disseminate a new form of mentoring called peer-group mentoring. While traditional one-to-one mentoring has mainly focused on unidirectional transmission of knowledge from an experienced colleague to a younger one, peer-group mentoring is based on knowledge sharing in a group. The mentor is still usually a more experienced colleague, but the interaction and relationship between the mentor and group participants is dialogical and reciprocal (Heikkinen et al. 2012). Without the national network involving teacher education departments, national labor market partners and other stakeholders, it would not have been possible to disseminate nationwide this new form of support system for newly qualified teachers. Thus, this network is a good example of the power of partnerships.

Another successful example of a partnership model, that in this case utilized preceptorship, is one implemented between a university and a healthcare organization to enhance the transition of novice nurses to the workplace and reduce the *transition shock* described earlier in this section. The preceptorship model has been widely adopted in the United Kingdom, Australia and North America and is designed to increase collaboration between tertiary institutions and healthcare settings (Ockerby et al. 2009). In this model, a preceptor who is a qualified nurse is assigned to work alongside a student nurse for the duration of the student's clinical placement. Research undertaken to examine this preceptorship model, between one tertiary healthcare facility in Melbourne, Australia in partnership with a school of nursing and midwifery from a major university; found that this partnership fostered the development of the students' competence through the continuity of returning to the same healthcare facility (Newton et al. 2011).

In this particular project, second and third year undergraduate nursing students, 20 of whom were in their second year of study and 8 were in their third year, were followed for a period of 2 years. During this time, the student informants were interviewed on five occasions. The students' age ranged from 18 to 55 years with a mean age of 29.5 years. The participants' fifth interview, by which time they were either engaged in or had recently completed their graduate year (i.e. the first year as a registered nurse); and included questions about the contributions of clinical placement experiences and the support provided by preceptors to participants' perceived work-readiness is drawn upon, to illustrate the outcomes of this partnership. The fifth interview also included a quantitative component comprising of four key questions, using a 5 point Likert scale ranging from 'not at all' to 'extremely' that sought participants' responses regarding: the effectiveness of the preceptorship model, the extent to which the participants felt 'work ready' at the end of the program, the extent to which their clinical experiences facilitated work readiness, and the effectiveness of preceptorship for work readiness. Ninety per cent of the students indicated a very positive response to this preceptorship model rating the program as 'very' or 'extremely' effective. More than half of the students reported 'very' or 'extremely' work ready at the completion of their degree and a similar proportion indicated that their clinical experiences prepared them 'very' or 'extremely' well to become a nurse. The nurses reported that their transition to work was enhanced through having familiarity of the organisation, as Amy, a newly graduated nurse noted:

I'm already familiar with the hospital, I don't need to learn about the paperwork, I don't need to learn about how the shift runs and, like what time the shifts start and finish, when the breaks are, um, how to do certain procedures, whether you need one nurse for a procedure or you need two.

Having this familiarisation with the actual organisational structure, reduced the nurses' stress and generated a degree of confidence amongst this group of new graduates and created a sense of continuity for them in their transition from student to new graduate worker. The nurses articulated that they did not feel, "so much like a fish out of water". This type of partnership model also fostered the important element of social participation which contributed to the new graduates' overall sense of work-readiness. The graduates recounted a sense of belongingness to the workplace when they were greeted by healthcare workers they had met or worked with during a clinical placement as a student. These 'familiar faces' within the workplace who acknowledged the participants generated an awareness of belongingness and being a part of a healthcare organisation. This point is illustrated by Marissa, a new graduate undertaking her first work placement at the healthcare facility where she had participated in the preceptorship model as a student nurse: "*It also is wonderful to be able to walk into the hospital every day and you walk in every day and people greet you. You have this sense of belonging*". This type of partnership model appears to enhance the social practice knowledge that individuals require to effectively engage in practice and further learning (Eraut 2004).

Research on graduate nurses' transitions (Andersson and Edberg 2010; Newton and McKenna 2007) found that the most influencing factors for new graduates to

gain confidence in their skills was the support provided in the workplace through their relationships with colleagues. Clearly such a partnership model, as this preceptorship model, enables the transition from student to worker a smoother passage, reducing the stress and enhancing the graduates' self-efficacy. Indeed, Korte and Lin (2013) found that for newcomers entering a work organisation that their levels of confidence was facilitated by the quality relationships and good mentoring offered to them. All of this points to the salience of partnerships in providing supportive educational experiences.

19.2.4 Instability of Occupational Identity, Early Attrition, and Changing Occupation

Occupational identity in the early phase of one's career is often weak, and young people may change their vocational field while actually studying a vocation. Dropping out from education is usually seen as a risk factor for remaining without any qualifications, unemployment and marginalization. However, it can also be seen as an opportunity for improving future prospects by opening possibilities for education in some other field that young people may experience more attractive. For example, Schmid and Stalder (2012) followed 1,300 Swiss young people who had experienced an early apprenticeship contract termination and found out that about three quarters of these continued their education within 3 years of the contract termination, and that the majority of them already resumed their education in the first month. Furthermore, these occupation changers were happier with their new education than with the previous one.

The issue of early attrition in health care, particularly among nursing, remains obstinately resistant despite significant efforts of government and employers. In exploring the premises of becoming a nurse Billett et al. (2010) found that diverse pathways were taken by individuals in pursuing nursing as an occupation. Billett et al. (2010) presented illustrative data of 9 student nurses from a subset of 28 student nurses who had participated in a longitudinal, multi-method investigation on workplace learning in nursing, in Australia. Individuals' pathways into nursing were either from direct school or from their experiences in which they had observed and came to appreciate nursing work. The informants shared that they had either undertaken care-related activities as part of their secondary schooling; volunteer community work in an aged care home having been previously expelled from school; as an option to secure employment and salary; commenced a higher status health related degree (physiotherapy) and changed to nursing; to caring for elderly parents. In a small follow-up study in 2010, Newton interviewed nursing students from the United Kingdom (UK) and America to ascertain if these types of occupational pathways into nursing were reflected elsewhere. Similar stories emerged with the students in these countries sharing accounts of always wanting to be a nurse to entering the occupation through association with a caring experience or incidence,

as Ruth from the UK, a third year student at the time of the interview, illustrates this with a change in occupation as well:

Entering nursing was a complete surprise for me. I went into nursing at 26 years of age having studied art for four and half years. It wasn't till I got pregnant and I just loved interacting with nurses and thought what a lovely job it is... you're with people at the most vulnerable times; it's such a privilege position to be in and to be part of it...

Prior to her change in occupation, Ruth had worked as a resident artist in schools and the community. Another student, Francis from America indicated that nursing was not always something that she had initially intended to do. She had spent her first three and half years after leaving school working as a customer representative in a hospital and then worked as nanny for two years. The prospect of the diversity of fields of nursing that a nurse can pursue a career in, led her to thinking about going to university.

The early phase of an individual's working career seems to be critical for attrition or retention. Early attrition has been widely examined in teachers' profession although research shows that attrition rates in teaching are not higher than in other professions that require comparable levels of education. For example, in a study by Harris and Adams (2007) turnover rate was about 15 % in social work, 8 % in accounting, 8 % in teaching, and 6 % in nursing. However, there are differences between the years of experience in attrition rates. According to the report by OECD (2005), younger teachers are more likely to leave the teachers' job than more experienced teachers. As the main reason for leaving, the report mentions poor working conditions. These may be related to workload, lack of support, student behavior and relationships with parents. Findings by Hong (2010) also showed that pre-service teachers tended to have naïve and idealistic perceptions of teaching. This finding suggests the need for more practice and real-life work experience during teacher education and training may be needed. This might also apply to other practice based professional field as well.

The issue of vocational school dropouts and occupation changes raises the question of the functioning of career guidance provision. Experts in the field of career guidance have argued for expansion of the guidance paradigm because the everyday field of guidance has changed (Sultana 2004; OECD 2004). One example of this paradigm change is seeing guidance as part of a wider horizontally and vertically networked support system of the society. For instance, Nykänen et al. (2012) have introduced a model in which schools, social, health, and public employment services jointly design, implement and evaluate regional guidance services. In this way, the networked partnerships may provide tailored and timely support for individuals in every life situation. It is worthy to note that the importance of preparation for practice in choosing an occupation was first brought to our attention by Dewey (1916). He proposed that the two purposes of vocational education was supporting individuals' capacities and interests; and preparing individuals for the occupation to which they are drawn too. Given our rapidly changing world, and from the examples offered from the studies on nursing students, it would seem that it is not only young people, but also more experienced people who may need

support while looking for their future field of study and work. Consequently, requirements for supportive arrangements may be far more widespread than just for ‘newcomers’.

19.2.5 Newcomers’ Role and Position in a Work Community, and the Importance of Workplace Learning

Hakkarainen et al. (2004, p. 145) have pointed out that typical of many communities of practice in contemporary workplaces is asymmetric distribution of knowledge and competence: Old-timers’ knowledge is mostly valued and transmitted to newcomers who, again, are supposed to adjust to existing working culture and practices. In one of the first author’s in-service training sessions a young teacher described this situation as follows: “New teachers with their new ideas will be suppressed in less than a year”. Many studies on novice teachers’ work challenges have confirmed these experiences. For example, in a study by Shoval et al. (2010) among novice physical education teachers it was found that very often new teachers suffer from a gap between their initiatives and the environments’ lack of appreciation. Similarly, Saka et al. (2009) have reported a case study illustrating a situation where a reform-minded novice teacher moves away from his goals of reform and compromises his earlier willingness to significantly contribute to the school context (see also, Maynard 2001). Naturally, these kinds of experiences of ignoring newly qualified professionals’ skills and knowledge are not restricted to teachers’ profession only but are common among new employees in any field.

Some newcomers’ support systems explicitly address the need of enhancing beginners’ engagement. For example, the study by Saks and Gruman (2011) represents a traditional approach where newcomers’ induction into a workplace is conceptualized as a *socialization* process. The purpose of this process is to get newcomers adjust to their new workplace and learn the behaviors, attitudes, and skills necessary to fulfill their duties and act as an active member of the organization. In their study, Saks and Gruman (ibid.) found that institutionalized socialization tactics involving structured, formalized and fixed forms of support was positively related to newcomers’ perceived person-job and person-organization fit as well as emotions and self-efficacy. Furthermore, they were indirectly related to newcomer engagement. Similar findings have also been recently reported by Simosi (2012) and Korte and Lin (2013) who found that perceived organizational support, supervisory support and colleague support influences transfer of training and commitment towards organization.

An alternative to the concept of socialization of newcomers into existing practices is presented by Wang and Odell (2007) who have analyzed models on the background of one of the most popular way of supporting new workers, mentoring. They make a distinction between three approaches to mentoring: (1) *humanistic perspective* emphasizing the development of newcomer’s self-esteem and confidence,

(2) *situated apprentice perspective* focusing on newcomers' adjustment to the prevailing culture of practice (and, thus, representing the above mentioned socialization view), and (3) *critical constructivist perspective* supporting critical outlook towards existing practices and structures, and developing reform-oriented mindset and collaborative knowledge transformation cultures. The last mentioned perspective could be seen as part of an organizational culture that Hakkarainen and his colleagues (2004) call "innovative knowledge communities". Typical of these communities is intentional pursuit of creating new knowledge and practices, open communication, networking, and knowledge sharing. The distribution of knowledge is symmetric and heterogeneous, meaning that not only old-timers' but also newcomers' knowledge is valued and utilized, and their fresh insights are heard and taken seriously in developing practices. Rubin (2009) refers to the concept of collaborative leadership as a form of leading the communal learning processes aiming at these kinds of practices. When this idea is applied into guidance provision discussed earlier, guidance personnel takes multi-professional responsibility for students' learning and education with actions promoting the practices, strategies and structures that support students' transition from one educational level to another or to working life (Jäppinen 2012).

Common to the ideas of innovative knowledge communities, professional learning communities, and collaborative leadership is that individuals' agency is supported in social communities. As Billett (2004) has described learning at work is mediated by both the contributions of workplaces and individual's agency. This same pattern was found to apply to studies of students' transitions from school (Billett et al. 2012). How individuals participate and interact in their workplace is central to their learning. But this is not enough. As the newcomers' experiences of suppressing their ideas described above show it is not only in the individuals' hands in how they learn and proceed in their job and career. The quality of learning depends also on the workplace affordances. Thus, in Billett's (2004) terms, learning at the workplace is reciprocally constructed in co-participatory practices where individuals elect how to engage in and learn from what workplaces afford them. These set of factors also played across accounts of school students to post-school life and extended to whether and how they elected to remain in educational programs or withdraw from them. Returning to the Australian study on the preceptorship model in nursing (see Sect. 19.2.3) the development of this co-participatory practice is illustrated through this longitudinal investigation of nursing students' transition to practice from student to qualified nurse and how the role of the registered nurse, who was the preceptor, influenced the novice's engagement in learning. The value of this partnership model as a developmental model for supporting competences resides in the close guidance provided by the more experienced practitioner to the novice. This is an important element of learning for health professional students as they adapt the teachings from the academic setting and make situational adjustments to the clinical environment under the guidance of their preceptor (i.e. a registered nurse). Preceptors' interest in engaging with novices and actively seeking out learning opportunities is also fundamental to the productive engagement of the

novice (Newton et al. 2011). Whilst preceptors might provide diverse learning experiences in the workplace, students, in this particular study, recognised and valued that engagement in learning opportunities is a reciprocal process. For example Stef, a 3rd-year student, pointed out that not only did one need preceptors who were: *'interested in and willing to help you learn'* but that it was also important for her to engage with the opportunities provided: *'I think it's a two way street.'*

The preceptors also acknowledged that in undertaking this role it was an avenue for enhancing their own clinical knowledge as they learnt alongside their students. For example Rose, a preceptor, reported: *'sometimes when they [students] ask something or they query something, I have to go and look it up too which I don't mind doing because that also shows up what you know and don't know.'* This willingness to engage in a preceptoring partnership is an essential component of learning in the workplace as Ben, a 2nd-year nursing student, commented: *'preceptoring is everything...a good preceptor can make or break a clinical placement.'* Zilembo and Monterosso (2008) suggest that effective preceptors are those who exhibit characteristics that include being competent, organised, supportive, motivating, and approachable with strong interpersonal skills. Thus engagement in learning through preceptorship is premised on a reciprocal process. This process, however, is augmented for novice nurses if their preceptors relate to them as individuals and realize the novice's personal knowledge and skill level. Participants in this study by Newton et al. (2011) identified the importance of preceptors being familiar with a range of learning styles, and recognising novices as unique individuals. As Jayne, during her second year as undergraduate student nurse, pointed out that it is important that preceptors acknowledge: *'each student as an individual in deciding what they can and can't do, recognising a person as someone unique.'* Whilst understanding the variations in individual novices' learning needs might generate more work in supporting and guiding them, Polly, an experienced preceptor, explained that, being a preceptor is: *'about allowing somebody to, to find their own way but guide them safely.'* An example of the guidance experience sought by students was described by Clare, during her third year as an undergraduate student, when learning two new skills:

When you are doing things like taking blood or doing an ECG, what I find helpful is a good preceptor, when I do the skill for the first time that I can be shown it and then I do it and that someone [the preceptor] is with me. That makes a big difference.

In her current research on workplace learning whilst undertaking fieldwork on a medical ward at a regional hospital in Victoria, Australia, Newton observed what she considered exemplary guidance by a preceptor, Sumi, to her second year undergraduate nursing student. A description of the event is below:

[At the nurse's work station] The patient is due for a daily injection. Sumi gives the student an explanation about the generic name of the injection drug and where to locate the drug order on the patient's medication chart. She questions her student on where she'll give the injection, seeking information from the student about what she has been taught at the university about giving this particular type of injection. Sumi provides detailed instructions including the underlying pathology on where to locate the injection making sure the student

is aware of the need to alternate injection sites, avoiding anywhere that might be pressured by clothing elastic. [Sumi and the student move to patient's bedside] Sumi guides the student as the student gives the injection, offering a calming voice "nice and steady" she says to her student. Sumi then directs the student to sign the patient's medication chart with her and make sure the patient is left in a comfortable position to have her breakfast. Sumi then checks that her student is okay, 'how did that feel?' She reassures her student that she did a great job.

This guidance by more experienced co-workers certainly can assist in developing the kinds of knowledge and skills required for expert performance. However, as identified above it needs to be recognised as a reciprocal process of participation by both the guide and the learner (Billett and Newton 2010). Students in the preceptorship model study did not always experience a facilitative guided learning environment. An experience shared by Eddie, when she was a second year undergraduate nursing student, she recounted an occasion when: "I walked into the handover room (i.e. a room where nurses at the end of a shift pass on information to the on-coming shift of nurses) and sat down and not a word was said to me. It was very hard, coming into an established team and they'll all know each other and have their way of doing things..." This situation was particularly challenging for Eddie, for despite having prior experience as an enrolled nurse and being a mature-age student, she felt quite intimidated by the nursing staff during her clinical placements.

The invitational qualities of the workplace are pivotal in enhancing the translation of learning from school to work. Experienced practitioners, Newton et al. (2011, p. 48) contend "need to be aware of providing appropriate and challenging learning opportunities and be flexible in allowing novices to experience different procedures and to practice skills themselves". Studies on workplace learning have shown that there are big differences between the workplaces in how and what kind of learning opportunities they offer for their employees' learning and professional development (Tynjälä 2008, 2013) and this variance can be seen in the examples offered from the studies presented in this chapter in nursing. Fuller and Unwin (2004) have made a distinction between what they call *expansive and restrictive approaches to workforce development*, the former representing an environment where people have plenty of opportunities to participate in diverse activities and communities of practice, while the latter describes workplaces that offer limited opportunities for learning. Certainly, the experience Eddie recounted above was one of a restrictive environment yet had the potential to be a rich pedagogical opportunity. The nursing shift handover can provide a learning moment for all the practitioners who are at different levels of competence, offering insights into nursing practices (Billett and Newton 2010). An expansive workplace arranges time for reflection and opportunities for boundary crossing, uses managers as facilitators, values innovation and offers people chances to learn new jobs and skills, while restrictive workplaces tend to rely on old practices and do not seek innovation. However, beyond what Fuller and Unwin (2004) propose about the different qualities of workplace settings, it is also necessary to include how individuals elect to engage in those environments. As Billett (2004) has shown even the most expansive of workplaces can be rendered restrictive if individuals elect not to engage in them and the most restrictive can be

render rich learning environments if learners act agentially. All of this emphasizes the importance of considering not only the two environments, but also the relations and interdependencies between them.

19.3 Conclusions

In this chapter, we have examined transition from education to working life as a critical phase in the development of professional competence. We have identified several challenges that newly qualified people meet when entering the world of work. The examination revealed that school-to-work transition is not only a young person's individual movement from one place to another but a part of individual, social and institutional process where individuals' learning needs and environments' requirements and circumstances meet each other. Transitions are influenced by individuals' cultural knowledge and expectations of others, their positioning within the organization and the opportunities afforded to them (Fenwick 2013), and also how learners elect to engage in these environments. Therefore, because transitions are practices that involve individuals making decisions about how they engage and for what purposes it is important to consider not just social practices of the settings, but also how individuals engage in them.

Transitions in human life cycle are phases when susceptibility to stress may increase. Finishing schooling brings about concern over employment and adjustment to a new working environment. Individuals may experience decreased self-efficacy and feel their skills and knowledge inadequate. Sometimes young people's expectations of the occupation or job have been unrealistic, or their identity development has been in such turbulence that they may find themselves as in a totally wrong line of work.

These kinds of challenges of newly qualified workers and professionals may give a quite dark picture of the transitions from school to work. However, there is another side as well. There are several ways to smooth over the problems and setbacks in the transitional phase, and here the role of social partnerships is crucial. Our analysis cautiously suggested that in countries where vocational education and training is based on apprenticeship training or includes a considerable amount of workplace learning the threat of unemployment after qualifications is smaller than in countries with a strictly school-based education. Partnerships may also be used in organizing induction support systems such as mentoring as was the case in the Finnish education system or through preceptorship as illustrated in nursing. Furthermore, lifelong guidance systems have been recently developed based on multi-professional networking between schools, social, health and public employment services in order to provide tailored and timely support in transition in any phase of a life cycle. Altogether, it seems that different forms of partnerships may play an important role in paving the way to smooth transitions and securing continuous professional competence development. At the same time these partnerships not only help individuals but they also may serve the development of vocational practice. However, the challenge in

determining if partnerships assist in enabling a ‘successful’ transition are difficult to determine due to the complex interplay of the myriad of educational, sociocultural and material relations that need to be considered.

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Chapter 20

Interprofessional Education in the Health Workplace

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Abstract Interprofessional education has served as a long-standing topic of interest in the health professions education community, mainly because of its reported capacity to develop the learner's disposition for team-based practice. This chapter synthesises the findings from the health professional literature and focuses specifically on the impact of interprofessional education on students within clinical placements. The review sets the scene for the reporting of an empirical study conducted by the authors, examining medical students' experiences of an interprofessional education placement. Medical students who rotated through the targeted interprofessional placement were interviewed via focus groups to elicit their experiences of the initiative. Their perspectives on how the context and the activities within the placement influenced their ability to learn 'with, from and about' other professionals were captured and analysed. Only a small percentage of participants reported that the workplace environment adequately supported opportunities for engagement with other professionals. The medical students, while able to voice the advantages of interprofessional practice "once they become" a practitioner, saw the agenda as

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relatively low on their priority list as busy students, subject to regular assessments of their ‘doctoring’ competencies. The results challenge the cheerfully optimistic literature on interprofessional education. It may be useful to acknowledge the resistance learners have in learning about other professions or disciplines when they have a fixed target of professional membership in sight. Undergraduate students seem to make judgements about what is important to learn, and who are the most legitimate models to learn from, very early in their curriculum. Students look to summative assessment as a key device to help differentiate the core from the peripheral within their program of study.

Keywords Interprofessional education • Interprofessional practice • Workplace learning • Health professions • Curriculum design

20.1 Introduction

20.1.1 *Overview of the Literature*

Interprofessionalism has increasingly emerged as an educational philosophy over the last 60 years. Outcomes of interprofessional education in the health context have typically focused on the student, and largely at the level of whether students’ enjoyed or reported value in educational initiatives designed to promote interprofessional learning (Barr 2005; Reeves et al. 2008; Reeves 2010). Many of these studies report that educational initiatives, particularly in the pre-clinical context, fail to engage learners. Even for those initiatives perceived as useful, there are few longitudinal studies tracking the impact of these activities on learners’ practices once they hit the authentic workplace (Davidson et al. 2009). The latest literature argues for the importance of positioning the patient at the centre of health professional education, and valuing the patient’s capacity as a teacher. This subtle re-orientation may better enhance health professional teamwork to achieve the best patient outcomes. This section will highlight how interprofessional education emerged, how it is being enacted in health professional education, at both pre-clinical and clinical (workplace-based) interfaces, and what we know about its impact on learners, patients and workplaces.

20.1.2 *The Emergence of Interprofessional Education*

Abdel-Halim (2006) refers to Arabic documents from over 1,000 years ago that promote the positive impact of teamwork on patient care. The earliest known reference to interprofessional learning in health occurred at the annual session of the American Dental Association held in Cleveland in 1953 where the House of Delegates discussed a paper, Sugar and Teeth. In that session, reference was made to a joint meeting of two medical and dental societies being held 15 years earlier, to

discuss interprofessional problems and the application of the newer knowledge of nutrition in practice (Hartford 1953). A further reference to interprofessional learning occurred in a paper published in a Pharmacy Journal (Illinois 1969), following which the Interprofessional Commission of Ohio, established at Ohio State University in 1973, offered interprofessional courses for graduate students and professionals in education, counseling, law, medicine, nursing, psychology, social work, and theology.

The further history of the development of interprofessional education is comprehensively discussed in *Motives & Movements* (Barr 2005) where he examines the development of cooperative care within nursing and social work during the 1970s, the rapid growth in medical specialization that led to an ultimately unhelpful separation of medical specialties from a shared engagement with other health professions. Barr (2005) also highlighted the emergence of collaborative care models in general practice, aged care, and psychiatry that acted as a stimulus to develop better shared care models for all patients. Much of the drive to develop better care models followed adverse publicity over a number of cases of poor medical care outcomes that informed Government policy decisions and directives to achieve better quality of care. These changes have contributed to improved accountability and shared care developments over the past two decades, with the key objectives of improving patient care, reducing the dependence on hospitals for much of the provision of care for the increasingly complex patients suffering multiple health issues and the increasing numbers of the elderly. These shared care developments, although well-meaning, have been somewhat fragmented and relatively unproductive (Bywood et al. 2011; Barr 2005).

This observed fragmentation of patient care has led to an exponential growth in the development of interprofessional education within the health professions, designed to promote effective teamwork and communication. This growth has been the subject of much government and university support in many countries with the development of specific societies to promote interprofessional education, such as the Centre for the Advancement of Interprofessional Education (CAIPE), founded in 1987, dedicated to the promotion and development of interprofessional education in the UK and overseas. It has a close association with the *Journal of Interprofessional Care* that commenced publication in 1992.

Parsell (1998) proposed that students need to know about the roles of other professional groups, need to be able to work with other professionals in the context of a team where each member has a clearly defined role, and need to be able to substitute for roles traditionally played by other professionals when circumstances suggest that this would be more effective. It has also been proposed that interprofessional education may afford flexibility in career routes, where individuals can move across discipline boundaries (Finch 2000). CAIPE (2002) subsequently defined interprofessional education as ‘occasions when two or more professions learn with, from and about each other to improve collaboration and quality of care’. The definition attends to three components; firstly, different health professions collaborating in the learning process, secondly, learning which embraces learning with, from and about one another, and thirdly, an outcome intended to improve patient care (CAIPE 2002).

Interprofessional education is underpinned by principles of adult learning and typically leans on interactive, collaborative and group-based learning approaches. There is also a strong flavor of learning about and appreciating the values of each other's professionalism.

Interprofessional approaches to health care are not only seen to improve patient outcomes, but have been linked to increased job satisfaction for health professionals (Barr 2005; Reeves et al. 2008). Although there are no data to demonstrate the next link, it would be a logical assumption that increased job satisfaction might have an impact on recruitment and retention of health professionals. In a health care climate characterized by an aging population and increased incidence of chronic disease, there is an associated marked workforce shortage. With this imperative to strengthen workforce numbers, there is a large amount of investment into searching for mechanisms to improve recruitment, retention and efficient work practices of health professionals.

20.1.3 Underpinning Educational Principles in Interprofessional Education

The role of and place for interprofessional education in health has been the focus of many texts and reports over the past decade (Hammick et al. 2007; Delany and Molloy 2009; Reeves 2010). These authors have explored the theoretical basis, the enactment, and the outcomes of over 25 years of interprofessional education endeavour. The results of interprofessional education initiatives were appropriately summarised in Allison's (2007) title, 'Up a river! Interprofessional education and the Canadian healthcare professional of the future', where she posited that while the benefits of an interprofessional approach to patient care were becoming well known, the establishment of interprofessional education in health care programs remained largely in the developmental phase (Allison 2007). She advised that if health professionals do not learn to work together, interprofessional education would continue to go in circles.

Cooper (2010), in appraising the work of Hammick et al. (2009a, b), noted that 'learning how to work interprofessionally is an evolving process grounded in experience, making fieldwork central to interprofessional learning' (p. 435). She pointed to the fact that much of the interprofessional learning research has been predicated on the learner's outcomes (being focused on assessment of interprofessional learning pedagogic practice) rather than taking into consideration improved care that is central to the patient's outcomes. At the core of this educational philosophy lies the re-emergence of the patient; the study of patient experiences as the axis of learning and an understanding of patient values, expressed in the view 'Nothing about me, without me' (Nelson 1998). Stewart (2001) and Slote (2007) also support a model of care based on listening to patient voices rather than as a virtue reflecting on our self. These researchers state that the design and implementation of patient care plans should be the priority, rather than persisting with interprofessional education projects that are centred on the student and their learning outcomes.

CAIPE's interprofessional learning definition embodies the well recognised 'learning with, from and about others', as well as the goal of these activities- improved patient outcomes. Hammick et al. (2009a) has suggested that we reverse the 'with, from and about' to, 'about, from and with' so as to emphasise the transitional change in learning moving from an interdisciplinary process to an interprofessional process. The so-called 'higher' goal of an interprofessional process positions collaboration or learning together as a joint process to achieve improved patient outcomes. Learning about and from does not necessarily translate the learning process into a joint learning enterprise of equality and interprofessionalism.

20.1.4 The Goals of Interprofessional Education

The ultimate goal of interprofessional education is to enable health professionals to undertake their roles as a part of a team in the effective care of patients (D'Eon 2004). Interprofessional education is underpinned by two assumptions (Davidson et al. 2009): first, that interprofessional education initiatives will lead to better interprofessional practice and second, that interprofessional practice will lead to better health outcomes for patients, clients and communities. The key to achieving this goal of better patient care relates to better understandings of the relationships between different professional groups as values and beliefs, collaboration and teamwork as knowledge and skills, roles and responsibilities as what people actually do, and the benefits to patients, professional practice and personal growth being what actually happens (Parsell 1999). Through these understandings, the prejudices existing between professions and the lack of awareness of the functions of each other may be changed, contributing to better teamwork and patient care. Each of these characteristics needs to be taken into consideration in designing an interprofessional education program. A further goal is to involve the patient, the family, the community of health professionals and the hospital or the providing institution in the process of effective participation and the communication of decision-making by each care-team member to the patient and family.

20.1.5 The Many Shapes of Interprofessional Education

Despite an international surge in discourse around the potential advantages of interprofessional education, there is still a lack of clarity about what constitutes effective interprofessional education. Davidson et al. (2009) presented a helpful conceptual framework where they positioned interprofessional learning activities in a table, ranging from low relevance to high relevance, based on mode of learning (passive to active), and degree of contextualization (ranging from away from the workplace setting, to experiential learning within the applied setting). The activities and the scope for interprofessional education are summarized below in Table 20.1.

Table 20.1 Activities used to promote interprofessional education (Adapted from Davidson et al. 2009, p. 75)

Learning activity	Evaluation of relevance to interprofessional education
Lectures	Typically limited scope for interprofessional interaction and collaboration. May be used to achieve content relating to interprofessional education objectives- including orientation to purpose of interprofessional education and interprofessional practice, models of teamwork and communication etc. Learner engagement often constrained due to class size and environment.
Practical or lab-based sessions	Rich in experiential learning opportunities (including technical and communication skill acquisition). Typically uni-professional but can be structured to accommodate different professions working together to develop targeted skills.
Tutorials	Vary in terms of experiential learning opportunities. Smaller student numbers cater for interactive learning and feedback opportunities on team work and communication skills (either peer driven or teacher driven). Problem-based learning can be an effective learning format as it is patient-centred by nature and students can see the relevance.
Online learning	Both individual and group-based learning. Scope for learning and assessment of competencies related to interprofessional education and practice. Student engagement may depend on the degree of authenticity of the virtual environment.
Simulation	Increasingly used as an educational modality due to its potential to replicate clinical environments and to generate opportunities for team-based care.
e-Clinics	Provide opportunities for students to observe either recorded or real-time patient-practitioner interactions or team-based communication. The lack of direct involvement of the learner lowers the stakes of the learning activity and allows learners to focus and reflect on the communication and teamwork skills exhibited. Needs a skilled facilitator or well designed prompts to engage the student and shift it from a passive ‘watching’ experience.
Experiential workplace learning	High relevance and authenticity. Can range from observational in nature (i.e. shadowing a practitioner) to practice under supervision (depending on the knowledge/experience levels of the learner). High potential for both informal and structured interprofessional learning and practice.

This chapter focuses on the potential for interprofessional education in the authentic workplace environment, as summarized in the last cell in Table 20.1. Within the clinical workplace environment there is large potential for structured interprofessional education where students ‘share’ patients and observe practitioners from a range of disciplines working together for the patient’s benefit. For example, medical, nursing and physiotherapy students may attend the one patient, complete a joint assessment of the patient (history taking and physical examination), engage in a collaborative process of clinical reasoning or problem solving

Table 20.2 Barr's (2005) modification of Kirkpatrick's Learning Outcomes

Outcome level	Impact of intervention
Level 1	Reaction-Learners views on the learning experience
Level 2a	Modification of attitude/perceptions
Level 2b	Modification of knowledge/skills
Level 3	Behavioural change
Level 4a	Change in organisational practice
Level 4b	Benefits to patients/clients

where they come to a consensus about the key problems and devise a prioritized management plan. This shared patient model is gaining momentum in health professional education (Anderson et al. 2006; Kent et al. 2012) and has received positive evaluations from students, staff and patients. Other forums such as team meetings and ward rounds also offer rich opportunities for students to engage in interprofessional learning and practice. Students may also observe the practices of other professionals either informally (for example, a nurse inserting a cannula while the medical student is taking a history of a patient) or in a more structured format, where a medical student may shadow a nurse or an occupational therapist for an afternoon on placement.

20.1.6 Evaluations of Interprofessional Education

While interprofessional education may improve learners' short-term knowledge and attitudes, there has been little evidence of persistent improvement or behavioral change in learners and insufficient evidence to guide the rapid changes in educational models or clinical practice that are developing (Piterman et al. 2010). Piterman recommended the need for prospective controlled trials with objective measurements of short and long-term learner behavior, processes of care and patient-based outcomes.

Many reviews of interprofessional education have been undertaken and have been evaluated using the modified Kirkpatrick Framework (Kirkpatrick 1994), published by Barr (2005). This classification system is useful in that the outcomes of the study are classified in terms of the impact of the intervention, ranging from the learners' views on the effectiveness of the intervention (level 1), to an impact on patients or clients (level 4b) (Table 20.2).

Using such a typology or classification system allows educational researchers and teachers to make meaningful comparisons between studies of interprofessional education. As Davidson et al. (2009) report "one of the challenges in reviewing examples of interprofessional clinical education is the range of evaluation approaches and outcome measures used in the field" (p. 78).

Barr (2005) review of 107 interprofessional education studies found that the majority of studies of interprofessional education in health have limited evidence of significant or sustained outcomes above level 2b. Of the more recent reviews, Hammick's et al. 2007 systematic review of 21 interprofessional education studies examined the effectiveness and contribution of interprofessional education to collaborative practice and better care. The review concluded that interprofessional education was generally well received by learners and that learners reported acquisition of knowledge and skills necessary for collaborative working. However, the review concluded that interprofessional education interventions were less successful in positively influencing attitudes towards others in the team. There was limited evidence to support the proposition that learning together would help practitioners and agencies work better together. The review concluded that staff development has a key influence on the effectiveness of interprofessional education and where such education reflects the authenticity of practice it is more effective (Hammick et al. 2007).

Davidson et al.'s (2008) systematic review specifically examined studies looking at interprofessional education in a fieldwork setting. The authors reviewed 25 studies of interprofessional education in pre-registration programs and found that there was a diverse range of interprofessional education experience durations (2.5 h to 9 weeks, with the most common intervention being 2 weeks). The team size varied markedly also- ranging from two to ten individuals. The review illustrates the wide diversity in how interprofessional education is enacted. And of course this intervention heterogeneity makes it very difficult to compare studies. The most common configuration of the interprofessional team was medicine and nursing students.

Margalit's 2009 study was undertaken by the Institute of Medicine, Nebraska, where they developed an integrated interprofessional education program in health profession curricula to improve health care quality. The program was developed, implemented, and evaluated as a campus wide program, shifting from traditional educational silos to greater collaboration and involving 155 nursing, medicine, public health, allied health, dentistry and pharmacy students and 30 faculty. The evaluation showed an increased understanding of health care quality and interprofessional teamwork principles, and reported positive attitudes toward shared learning (Margalit 2009). A further Cochrane study by Zwarenstein (2009) reviewed randomised controlled trials of practice-based interventions in interprofessional care compared to no intervention or to an alternate intervention. The effect of the interventions on patient satisfaction, the effectiveness and/or efficiency of the health care provided and the degree of interprofessional care achieved were examined. Five studies, four of them published since 2000, met the inclusion criteria. The review suggested that practice-based interprofessional learning can improve healthcare processes and outcomes, but given the small number of studies, the sample sizes and their heterogeneity and problems in measuring learning outcomes, drawing any conclusions about the key elements of interprofessional learning and practice is difficult (Zwarenstein 2009).

20.1.7 The Move to Patient-Centred Education

In Australia there has been a rapid growth in interprofessional education initiatives, particularly involving rural clinical placement programs, new interprofessional clinical educator positions, interprofessional practice professional development, workforce programs and the use of simulation centers. However, these activities occur in pockets across Australia, without co-ordination or communication between the committed educators and professionals driving these programs. There has also been a lack of direction by governments (Thistlethwaite 2007). This collective of individual activities contrasts to the central government approaches which have been in place in the UK, Canada and Sweden for some time (Davidson et al. 2008).

The widespread growth of undergraduate student interprofessional education and the expansion of the activities being undertaken do reveal improvements in understandings of the roles of health professionals, and the importance of teamwork and shared learning. Contemporary literature identifies only a few studies showing evidence of benefits to patient outcomes. More recent patient-centred projects have shown a progression from learner-centred educational objectives that by their nature are limited to level 2 outcomes (Barr 2011), to outcomes arising from direct student-patient dialogue grounded in the patient's experience and discussed in realistic clinical situations such as student clinics, giving benefit to the patient and improving patient outcomes-levels 4 (Anderson et al. 2012; Kent and Keating 2013).

Hudson et al. (2010) argues that the next phase of interprofessional education should embrace the richness of the patient experience, which is so readily and willingly available to students. This can be achieved through further adapting the intent and design of workplace-based learning experiences where students are orientated explicitly to interprofessional practice competencies and are guided towards opportunities to develop these skills. The opportunities or invitations that are most likely to impact on learners are those that are based directly around the patient. As Sir William Osler advised 'In what may be called the natural method of teaching, the student begins with the patient, continues with the patient and ends his study with the patient, using books and lectures as tools, as means to an end. For the junior student ... it is a safe rule to have no teaching without a patient for the text, and the best teaching is that taught by the patient himself' (Osler 1903, p. 331).

The next section in this chapter will present a pilot study that sought to better understand the interprofessional learning opportunities available to medical students placed in a sub-acute clinical environment. This case study serves to highlight the interprofessional experiences of students in the workplace-based setting, and in doing so, sheds further light on how we might better design interprofessional education programs to legitimately capture students' attention and build their capacity to work effectively with others.

20.2 A Case Study: Medical Students' Experience of a Clinical Placement Program Designed to Develop Interprofessional Learning and Practice

The research team undertook a study to examine the impact of an interprofessional education clinical placement on medical students' knowledge of the roles, responsibilities and functions of nursing and allied health staff, and their perceptions of their own development of skills in interprofessional communication and teamwork.

20.2.1 Methods in Brief

The study examined the experiences of a group of medical students in their first clinical year of the program, completing a clinical placement at a palliative and rehabilitative care facility. The clinical placement took place in a sub-acute hospital comprising two rehabilitation wards and a palliative care ward, each with clinical directors, resident staff, specialist nursing and allied health staff. The placement was designed for 3 weeks, and involved three to four students at a time, rotating as singles or pairs within the three wards. Prior to the placement the students were informed by the Clinical Education Director that one of the objectives of the placement was for medical students to work with and learn from other health professionals, in addition to the supervising doctors. It is important to note that no formal interprofessional education activities were mandated, and that no assessment tasks were linked to the interprofessional competencies. Rather, the clinicians carried out 'normal practice' with the knowledge that medical students had opportunities to learn about, and work with other professionals while on the placement.

Participants were recruited from the student cohort undertaking this clinical placement rotation in the academic year 2011 (n=15). Students were invited to participate in the study via email, and interested participants took part in one of three focus groups after their placement. Students were assured that their attendance was not compulsory, and would not impact their course assessment in any way. The focus group questions are represented in Box 20.1 below.

The audiotaped raw data was transcribed and anonymised after each focus group.

The data were interrogated using Thematic Analysis, starting with coding of the data where sections of data were labelled with a node (Miles and Huberman 1994). Coding was undertaken by three independent researchers (LG, EM, CF) and was facilitated by QSR NVivo2 data management software. The list of nodes was then consolidated through grouping nodes of similar meaning. This resulted in a shorter list of nodes that emerged as the themes in the data set. The themes and illustrative quotes that support these findings are presented in this next Section.

Box 20.1

- Please provide a brief summary of the placement – what was the clinical focus?
- Have you completed any other placements this year?
- Would anyone in the group like to comment on the possible benefits and outcomes of their learning in this placement?
- Could you please describe the interactions you had with non-medics?
- Could members of the group please explain whether they feel their perceptions of the roles and responsibilities of the health professionals have altered?
- Could members of the group comment on what they think is the best time to learn with, from and about other health professionals?
- Could members of the group comment on whether shared/interprofessional learning (if you feel you experienced any) assisted the development of communication skills and/or patient care?
- Would anyone in the group like to comment on whether they feel that shared learning helps medical student learning or not?
- Could members of the group please comment on whether they feel that the period of learning at the placement in question has had any influence on the development of the way you might practice as a doctor?
- Do you feel that you modelled your supervisors at all?

20.2.2 Key Findings

The three key findings that emerged from the study were that medical students reported that:

1. Interprofessionalism sits on the margins of medical practice
2. The placement, although intended to promote the development of interprofessionalism, lacked the design qualities needed to achieve these competencies
3. Discipline-based role models are key to orientating learners to what is important in practice

20.2.3 Theme 1: Interprofessionalism Sits on the Margins of Medical Practice**20.2.3.1 It's Important but Not Very Important**

It was encouraging to note that almost all of the participants in the study acknowledged that there is a role for interprofessionalism in health care practice and most were

able to articulate the benefits of interprofessional practice in terms of improving the quality of patient care:

I spent most of my time on the rehab so I saw a lot of mainly physiotherapists. They play quite an important role because they do most assessments of the patients' physical illness, whereas the doctors didn't really have the opportunity to do that. – FG1

So I guess in the doctors' case is the treatment on how the patient is doing and what the physiotherapists feed back to the doctors. They basically work in hand in hand to figure out what's best for the patient. – FG1

The above quotation typified the responses from many of the participants- that practitioners from multiple professions work together to optimise outcomes for patients.

However, despite acknowledging the importance of understanding the different roles of different professionals, and the importance of teamwork to enhance patient outcomes, the bulk of students' statements reflected that interprofessional education and practice in the workplace were seen as peripheral to 'core medicine.' The quotes below illustrate this positioning of interprofessional education and practice at the margins of medical practice.

It [the placement] has got to be relevant to the medical things – FG3

I think there's less appeal [an interprofessional placement], especially at the early stages where we're just trying to acquire all that medical knowledge – FG1

It was more incidental that you learned something from physiotherapists... definitely more interested in looking out from the medical point of view – FG2

It's definitely valuable but I don't know at this point whether it's a major priority. – FG2

As students we're limited in time and we're always running around. So we don't get into that depth, so I think if you just want to know what's happening with a patient, we just look at the medical issues. – FG2

We [also] have so much other stuff that's more important at this moment – like studying for exams – FG3

Some participants were more overtly suspicious of the value of interprofessional education within the curriculum, and the role of interprofessionalism in the workplace. Their responses betrayed their bias that interprofessional practice is restricted to referral of patients to different services offered by others:

I don't know what the actual aim of the whole inter-professional aspect to the course is. I know they keep talking about it's well and good but when you go in and sit in the dregs of rehabilitation, it's great to get sort of your head around it. You do a little rehabilitation, you do some exercise movements and things like that. But at the end of the day I'm never going to be confident to be able to do those rehabilitation procedures with a patient for example. At the end of the day that, really, all I should be able to say is, yeah, we're going to send you off to this person who is a specialist in their own field – FG2

20.2.3.2 Why Invest in Structured Learning When the Skills Are Intuitive?

Even the students that were able to articulate the need for an understanding of what other practitioners do in order to refer patients correctly seemed to believe that this knowledge would come to them in time, without purposeful effort or structured learning. A similar sentiment is reported in literature describing student and practitioner attitudes to 'non technical skill' development- encompassing communication, teamwork, leadership and reasoning (Nestel et al. 2011). In short, this parallel

literature presents the tendency for practitioners to think that non-technical skills are not ‘technical’ by nature, and are therefore skills that people either possess or do not possess- impacted minimally by structured learning experiences.

It’s important for us to know about the different allied health services because we’ll probably have to send our own patients there ... I suppose I’m leaving that to time rather than any structured learning – FG2

I can see a lot of people trying to avoid it or miss it [interprofessional education] because they’d be like ‘oh well, what am I possibly going to get out of it?’ – FG2

20.2.3.3 Challenging Early Expectations About What ‘Doctoring’ Means

Many students alluded to the hierarchy in health care practice, with doctors positioned as the leaders, and other health professionals supporting the role of the doctor. Some participants were legitimately surprised when practitioners other than doctors took the lead in clinical scenarios or meetings.

So I saw a MET Call. A lady collapsed at the Rehab Facility, and when we had come there was already a doctor, nurses and physiotherapists around, because it was in the physiotherapy department. You’d expect the doctors to be calling all the shots but I think the nurse there was quite experienced and she obviously had her training as well. So she was asking all the questions and the doctor was obviously asking questions as well but not so much as the primary person in that situation. So I think that nurse played quite an important role in that, to ensure that – she asked a lot of questions, that the patient was okay and that, so obviously she had the doctor there for support but that was an example where the role of the nurse was the leader – you wouldn’t expect that. You’d expect the doctors to be – FG1

I mean I guess just seeing how there can be team work and interplay between different health professionals and allied health and that it’s not strictly doctor’s role’s a doctor’s role and a nurse’s role is a nurse’s role and doctor tells nurse what to do – FG1

The atmosphere was very casual and everyone gets a turn to talk, which is a lot different to what I’ve seen in an acute hospital, because usually it’s a consultant talking the whole time and other people are just furiously writing down notes – FG1

Of note are the students’ reports that they would expect that the doctor would take the leadership role in any team-based interaction. These three students had only experienced 3 weeks of clinical practice so it is fair to assume that these expectations about the role of different professions are already set before the students reach the clinical interface. These stereotypes may well be established or reinforced within the pre-clinical curriculum (Davidson et al. 2009), or even before enrolment, through the influences of popular media and popular narratives. The attitudes expressed in this data set prompt us to question how early to start interprofessional education initiatives within the curriculum. Indeed there is plenty of heated dialogue in interprofessional education circles about when to introduce interprofessional education activities within a professional program (Davidson et al. 2008; Barr 2005). Advocates for the early introduction of interprofessional education argue that these competencies are framed as part of being a competent practitioner, regardless of the individual profession. Advocates for a later introduction argue that there is merit in learners understanding and relating to their own professional standards and culture, before they are able to decipher differences and similarities between professional groups.

For one third of the sample in our research, this particular placement represented their first ‘hands-on’ exposure to the roles of other practitioners in health care. Their responses suggested that they had already established a frame for the hierarchy and roles of practitioners in the workplace. The responses prompted the focus group facilitator to probe further about their pre-clinical curriculum and the potential impact of formal or informal learning about interprofessionalism:

- Interviewer: Had you, in your own opinion in your academic course, had you had formal lectures or people come in to talk about those roles [of practitioners outside medicine]?
- Respondent 1: Not really.
- Respondent 2: No, not really, I agree with you.... We know that they’re there and we were told when we came here to the placement that it was going to be different and that was probably the place we were going to, I guess, appreciate the role of allied health in the health care. – FG2
- Interviewer: What about – I’m just thinking in terms of your academic curriculum, the first year when you’ve got case based learning or problem based learning. Was there much sort of inter-professional practice fed into the actual cases? Did you learn about what social workers did in the case or was it medico-centric?
- Respondent 3: Everyone was different – every group was different. It depended on your tutor.
- Respondent 2: Yeah, you make your own objectives. You read the case and you make your own objectives. So if your tutor or your group didn’t value that sort of stuff you wouldn’t make objectives that related to that. Everyone has slightly different learning.
- Respondent 4: But even then, there wasn’t ever written into a case that he goes to see an OT now, or he goes to see a physio now. So it was never really prompted for us to learn. One of my friends was applying for [medicine at another University] and apparently for their first two years they do some classes together, like med students do it with physios and all that. Maybe that would be a good opportunity to [unclear], like a joint class with a doctor and a physio leading it. – FG2

The students acknowledged that the emphasis on interprofessional education in the pre clinical curriculum was dependent on how much they chose to invest in it- that is, whether they saw it as a priority in their case based learning sessions. Notably, the students reported that it was their tutor’s inclination that helped them to navigate and prioritise learning objectives within formal teaching activities. The data is a reminder that the ‘experienced curriculum’ can be indeed very different to the ‘intended curriculum’ (Billett 2006; Molloy and Keating 2011), and that factors including teacher interest, motivation and skill, and student individual interest and motivation can intersect to produce very different learning experiences within the one cohort.

20.2.4 Theme 2: Placement Design Properties

20.2.4.1 Lack of Formal Invitations

Students reported that they were aware of the overarching goal of the placement to learn about and practice with other professionals. Many reported that they did not successfully achieve this objective, namely because of the lack of structure of the placement, and formal activities that aligned to the interprofessional education objective.

- Interviewer: Can you comment on the interactions that you had with people that weren't doctors?
- Respondent 1: Mine was minimal.
- Interviewer: Minimal?
- Respondent 2: Minimal.
- Interviewer: No Allied health or other practitioners?
- Respondent 3: There was more on palliative. They all did ward rounds together with the allied health and the – what was that guy? There was a – he wasn't a social worker – palliative care?
- Respondent 2: He's in the pastoral care group.
- Respondent 3: Pastoral care.
- Respondent 3: I don't know. Anyway, the pastoral care worker was – he took us aside and told us his aspects and I talked to him a little bit. I think I might have had more experience with the allied health there because I used to be a dietician and I knew the dietician there and so I used to sit in the allied health tea room instead of the doctors' tea room. But I think if I hadn't had that I wouldn't have had much experience with the allied health. FG3

The students alluded to a lack of legitimate invitations for learning:

They said we were welcome to join the physios I don't know where that offer went missing or whether it was just a failure on our part to initiate it – FG2

In this response above, the student entertained that the lack of engagement with other professionals may have been a function of their lack of initiative in seeking out the experiences. There is ample literature in health professions education describing the challenge of workplace-based learning for students, particularly as they enter the environment for the first time (Molloy and Keating 2011; Delany and Molloy 2009). Not only do students experience a steep learning curve in skill and knowledge acquisition, they also need to read and engage in a new practice environment, often bound by unique culture and rules. Students also report that negotiating the relationship with their supervisor is another significant stressor in their early learning experiences (Molloy 2009). It takes a proactive and highly confident student to approach their own designated supervisor for learning experiences and feedback on their own performance. Approaching another practitioner outside their profession, who may not be receptive to the teaching encounter, may represent a significant challenge to students. This study did not examine the opinions or expectations of health professionals within the clinical environment. The student data alluding to this lack of structured facilitation suggests that it might be important to better understand the readiness and skill levels of practitioners in relation to interprofessional education and practice.

One student indicated that this difficulty in accessing other professionals might be overcome with formal and mandated opportunities to shadow other practitioners. For example, an opportunity to spend a half day with an allied health practitioner and another half day with a nurse, and to log this experience as part of satisfying the expectations of the placement:

- Respondent 1: I think if we spent one day with each different kind of allied health person, like one day with the social worker, one day with the physio, one day with the OT...
- Interviewer: Like shadowing?
- Respondent 1: Yeah, we'd find out a lot more about their profession than we think we know. – FG2

20.2.4.2 Informal Invitations

In contrast to the students who reported little contact with others outside medicine, some students experienced rich unstructured episodes of learning that were initiated by allied health staff. In the example below, the student conveys their productive experience of ward rounds where the physio, positioned at the back of the group with the medical students, took on an informal teaching role, ‘interpreting’ the events occurring between the patient and the consultant in the ward round.

Just during rotations I found that the older physios who had their own students to teach, they’re far more available to explain what’s going on because the doctors are really involved with the patient. We’re usually standing at the back and that’s also where a lot of the allied healthcare workers stand. So quite a few times the physio used to explain to me what was going on. – FG2

I had that same sort of experience as well with a physio on ward rounds explain things to me – FG2

20.2.4.3 Clinical Context Affording Interprofessional Learning Opportunities

Many participants thought that the greatest strength of the placement in encouraging interprofessional learning, was the nature of the clinical environment itself. The palliative care ward was recognized as a distinctly different way of practicing medicine, where there was focus on the person and their agency, compared to a typical acute ward, where the focus was on fixing pathology. The patient-centred nature of the care was seen to promote more opportunities for practitioners to work together for the patient.

I guess it’s a different approach to medicine, as much as the doctors there is a strong nursing support and pastoral care and a lot of other services that work together. That was a great place to be exposed to it – FG1

Yeah, so it was really good to see the – I don’t know the aspect of more looking at the human being. Even though the disease is never going to be stopped, they helped a whole person instead of just one condition – FG2

20.2.4.4 Geography Playing a Part in Generating Silos

Although the clinical context itself was seen as a facilitator of interprofessional practice, the physical setting of the placement, including the student common rooms, was viewed as a constraint to student-to-student interprofessional interactions. When asked if medical students interacted with students from outside medicine, one participant stated:

No, not really. Even in the common room downstairs the physio students go into a different room and the med students hang in a different room and that started to break down because we all watched basketball together. But that’s about the only time we really talked to them – FG2

20.2.4.5 Assessment Creates the Learners We Deserve

Students repeatedly raised the concept that assessment was a strong pointer to what is most important in their learning. This sentiment that assessment drives learning is expressed in the literature on assessment in both higher education and workplace based learning (Ramsden 1992; Boud 2000; Boud and Molloy 2012). Boud's (2000) paper on sustainable assessment argues that teachers' design and implementation of assessment tasks strongly influences the type of learner that is generated. Reeves et al. (2002) and Davidson et al. (2008) have also written about the importance of assessment in driving students to develop interprofessional knowledge and skills.

At the end of the week you would be like, well, how is this going to help me progress? – FG3

I would probably look at it [interprofessional education] and say, how is this going to help me? You know, looking very short-sighted, how is this going to help me pass my exams? When you're that smashed for time you really want to get down to the nitty gritty – FG3

We had a huge focus [on interprofessional education] in ours [problem based learning tutorials]. It depended on your tutor and our tutor was pretty forceful about what does a social worker do, what does an OT do? It had to be an objective. But whoever got that objective wasn't happy with it. At the time it was not assessed on our exams so no-one wanted to learn about it – FG2

The students alluded to the crowded nature of their curriculum, and the need to prioritise what needs to be learned. They (sensibly) saw summative assessment as a way to help them navigate the educators' priorities. The lack of formal assessment tasks relating to teamwork and knowledge of other professionals' roles served to devalue interprofessionalism within the program. Boud (2000) describes the multiple functions of assessment in learning. As well as its stated aims in evaluating specified learning outcomes, assessment acts to both overtly and covertly communicate what is valued by a profession.

20.2.5 *Theme 3: Discipline-Based Role Models Are Key to Orientating Learners to What Is Important in Practice*

20.2.5.1 Like Likes Like

Almost all the participants reported that they looked to mentors within their own profession as good models for practice, including interprofessional practice. Intuitively, it makes sense that learners, in seeking to reach membership within a profession look to 'one of their own' as models for practice and as credible sources to provide them with feedback on their own performance in relation to intended standards (Molloy et al. 2013).

Every time you see a doctor do something good or do something bad, you think oh I want to do that, or I don't want to do that – FG2

But yeah, you just had to model yourself against the medical rather than the other allied health, I think. But I think you probably could learn from allied health in the way they approach things as well, but I just haven't been exposed to enough allied health to comment on that – FG1

We weren't sort of going in and going let's watch physio and let's try to be physios this week – FG3

The students tend to want to just attach themselves to the doctors and the consultants and learn from them rather than trying to ask a social worker whether they could follow them for the morning – FG3

Rather than educational designers being optimistic about the degree to which students engage in innovations that target interprofessional competencies, it may be important to acknowledge the resistance that learners have in looking outside their profession for clinical role models. In our own case study, the most persuasive players are the doctors themselves- in the way they demonstrate productive teamwork, in the way they talk to other professionals and in the way they talk to students about the role and value of other professionals.

20.2.5.2 Unhelpful Modeling

Students reported picking up on stereotypes and antagonism between the professions during their encounters with practitioners outside medicine. In asking to learn from a nurse, one medical student reported that the nurse agreed to help on the condition that he would not turn into a doctor 'all pushy and stuff' when entering the workforce.

- Interviewer: So how did that go? How did you invite yourself to follow the nurses?
 Respondent 1: 'I'm really crap at this, you're obviously better, can you show us how to do it?' We just kind of said 'we're students, we're not very good, can you show us?' The nurses are always like 'oh yeah'. Every time you get to a nurse they're always like 'alright I'll show you this, but remember this when you're a doctor and don't be all pushy and stuff'. Every nurse I ever talked to. They just like to say 'in the future don't be a jerk.'
 Interviewer: I'm seeing some heads nodding. Did other people experience that?
 Respondent 2: Yeah, I've heard that quite a few times. Because I guess we're in a position now where we don't know much and we're happy to learn from anybody. So when we do the nurses always like to throw that in. But yeah, I guess they want us to be pleasant to work with.

Ironically, although this nurse may have been attempting to dissolve professional boundaries, they may have further perpetuated professional divisions through referring to stereotypes.

20.3 Pulling the Threads Together: Facilitators of Interprofessional Education

Although there is a compelling rationale for training health professionals to work together, there are few published guidelines on how to enact interprofessional workplace based learning. In most countries, uni-professional clinical education is the staple, and there tends to be a peppering of interprofessional objectives within

Table 20.3 Curricular components to consider when implementing interprofessional education in programs

Curricular component	Examples
1. Learners orientated to the purposes of interprofessional education and practice	Explicit learning outcomes relating to developing interprofessional practice, clear expectations that students will learn with other students and practitioners from professions ‘outside their own’ and providing early examples of effective team-based patient care.
2. Profession-based role models endorse the importance of interprofessional practice through narrative and action	Role models talk the talk and walk the walk of IPP. For example, a doctor teaching into the academic curriculum at University will ‘tell stories’ about the positive impact of IPP on patient outcomes. In the workplace setting, a doctor will communicate with other professionals effectively when caring for a patient, and frame other professionals in a positive light when debriefing with medical students about a case.
3. Practitioners from ‘other’ professions teach students at knowledge and skill level	Students are taught by capable others, outside their native profession. For example nurses teach into medical PBL tutorials, physiotherapy academics give anatomy lectures to medical students, an occupational therapist provides a tutorial on hand rehabilitation post tendon trauma in the workplace setting.
4. Learners participate in activities promoting interprofessional education	Activities to build student engagement and foster interprofessional education including patient cases –what would the paramedic do at arrival on the scene? How would the nurse assess the patient on arrival to the emergency department? etc. Clinical placements- following or tracking patients and involved in all aspects of their care. Team meetings also feature invitations for interprofessional education.
5. Learner disposition for working with others developed through formative and summative assessment in the workplace	Identification of IPP-based behaviours on the workplace assessment instrument (for example an item on “Works effectively with other professions and healthcare teams.” This explicit item serves to orientate learners to the fact that interprofessional competencies are a core outcome in workplace learning experiences. It also ensures that students receive feedback on how to improve aspects of their interprofessional practice.
6. Incremental challenge of interprofessional tasks that are consumer centred	Development of tasks that progressively challenge learners to work together for the consumer/patient. Without progression in complexity of required knowledge, skills and attitudes, learners are unlikely to engage with these competencies over time.

these experiences to encourage learners to observe and respect the practices of ‘others’ outside their profession.

The case study presented in this chapter illustrates the difficulty in establishing an effective interprofessional education program, embedded within the workplace. Although the case study focuses on the health workplace, the emergent themes may have application to the broader field of interprofessional education. Table 20.3 within this section highlights key curricular features that may encourage students to learn

with, from and about others. Again although these recommendations stem from the study of interprofessional education in the health workplace, it is anticipated that these program features may add value in the broader context of interprofessional education.

In the case study, despite medical students articulating the interprofessional learning aims of the placement (developed by curriculum designers), their reported experience deviated considerably from these aims. Medical students reported lack of legitimate invitations to work alongside ‘other’ professionals or health professional students, intimidation in asking to be exposed to experiences or knowledge provided by professionals outside medicine (stepping on toes), and conveyed their biases about the perceived importance of interprofessional learning and practice- along the lines of yes, it is important, but not as important as learning the technical skills needed to be a doctor.

These attitudes were expressed by some students at the very start of their clinical placements. This illustrates the potency of the university-based curriculum in shaping attitudes about what professional practice is about, and what is important to know in order to get there. In other words, even though this chapter has focused on initiatives in workplace based (clinical) education to promote interprofessional learning, the success of such initiatives may be influenced by how learners are socialised within their academic curriculum. A study by Reeves et al. (2002) also supports the importance of the pre-clinical curriculum in orientating learners to the importance of interprofessional practice and learning. The data suggest that to further the cause of interprofessional education, we may need to better focus on how activities are sequenced throughout the entire curriculum, rather than focusing on the implementation and evaluation of discrete, once-off pilot interventions.

Many of the focus group participants acknowledged that interprofessional practice is important long-term, but reported that development of these skills was not a key priority for medical students. Their focus was on ‘medical knowledge’ and technical skill acquisition. This privileging of technical skill development over ‘non technical skill development’ is reflected in a number of studies examining health professional students’ preparation for practice (Molloy and Keating 2011; Chumley et al. 2005; Prince et al. 2005; Small et al. 2008). As one participant noted:

It’s [interprofessional education] definitely valuable but I don’t know at this point whether it’s a major priority. I know that in our final year, our fifth year, our pre-intern year, we don’t have as many tutorials and it’s more about what you want to do and learning about that. Maybe it would be more suitable at that sort of session because you should have, I guess, an understanding of the medical side of things – FG1

The students’ positioning of interprofessional education and practice outside core ‘doctoring’ was a feature in the data set. The sentiment expressed in the quote above is that, yes, interprofessional education is valuable, but it is an added set of skills to acquire once you have the nuts and bolts of medicine under your belt. Interestingly, communication and teamwork, key capacities needed for interprofessional practice, also feature under the umbrella of ‘non-technical skill’ (NTS) development in medical education. There has been a recent shift in the literature on NTS development in the health professions, with a call that even the term ‘non-technical’ skill is unhelpful in the plight to orientate learners to the pivotal role

of these skills in health professional practice. Nestel et al. (2011) proposed that the term NTS is unproductive and unrepresentative in that it oversimplifies the importance of these skills in professional practice. As an alternative to NTS, they advocate using the term ‘human factors’ to represent the collection of skills needed to work effectively with others. The authors posit that the ‘non technical’ implication may lead learners to think that the associated capacities are not specialised and can not be learned as they are linked to personality (you’ve either got it or you don’t mentality). The danger of this ‘non-technical’ sentiment is that learners may not invest time or energy into developing these capacities, particularly given the packed nature of their curriculum.

One of the barriers to achieving interprofessional learning is the view that learning or practising interprofessionally may hinder professional identity formation (Hall 2005). As reported by Davidson et al. (2009) “there is a great deal of investment by various professions in socialising new inductees into their chosen profession” (p. 84). The participants in our case study also expressed this belief that you have to learn what it means to be a doctor first, before you can take on knowledge about the roles of others in the health system. This is a ‘staggered’ approach of learning, where students focus on ‘what you are’ first, and then use this understanding to delineate self from ‘others’. The danger of this approach is that it positions interprofessional learning and practice away from a core competency – something that you learn once you become an occupational therapist, or once you have become a nurse. We argue that a more productive framework is to position interprofessional practice as part of being a doctor/physio/nurse. To achieve this ‘core competency status’, it is very likely that interprofessional learning and practice needs to be introduced as early as Day 1 in the curriculum, along side knowledge and skills in hand hygiene, anatomy, suturing and communication.

The need to position interprofessionalism as a core set of competencies is also argued convincingly by Davidson et al. (2009). If learners do not see the value in engaging in the learning activities designed to promote these skills, there is very little value in setting up such opportunities within the workplace setting. This peripheral positioning of interprofessional education within a health professional curriculum is not a phenomenon unique to interprofessional learning. Molloy and Keating’s (2011) study, examining how physiotherapy students prepare for workplace learning, also highlighted that students, very early within their academic program, make decisions about what is needed to be learned in order to progress and to work as a practitioner. This physiotherapy study did not specifically examine students’ regard for interprofessional education, but rather how they viewed reflective practice.

When focussing on students’ lack of prioritisation of certain aspects of the curriculum, a number of comparisons can be made between the literature on developing reflective practice and interprofessional practice in students. As reported by Molloy and Keating (2011) “One of the constraints to students’ engagement in this learning agenda is their quick judgement of ‘peripheral’ content – viewed as removed from core business” (p. 79). As discussed in this chapter, thoughtful and deliberate curriculum design, can help navigate students to what it means to be a good practitioner, and what they need to prioritise in their training.

It is also likely that role modelling by staff (both in orientating students to the value of interprofessional education and practice) and the type of teacher (nurses teaching anatomy in the medical curriculum, physios teaching orthopaedic assessment skills) will enhance the message that working with others, and learning with, from and about others are core skills for any practitioner. Medical students repeatedly raised that it was natural for them to look up their medical colleagues and teachers as role models. This suggests that perhaps if we want to orientate learners to productive interprofessional behaviours, it might be best achieved through the efforts of teachers within their own profession.

So what are the curriculum features needed to develop effective interprofessional education in a pre-registration program? The medical students in our 2012 study helped to distil these components through their discussion about what worked and what did not work in their interprofessional education placement. Interestingly, even though our study examined interprofessional education in the workplace learning environment, the data pointed to the importance of setting up interprofessional objectives, activities and assessment throughout the entire curriculum—both pre-clinical and clinical. Table 20.3 above summarises the key components that may be considered at both university and workplace/fieldwork interfaces in order to develop practitioners with dispositions to work effectively with others.

As argued by Davidson et al. (2009) “there is no universal blueprint for how to ‘do’ interprofessional clinical education” (p. 84). What is apparent is that there are plenty of discreet educational interventions that are being trialed, perhaps with a lack of deliberate consideration for how these initiatives sit within the wider curriculum. The case study presented in this chapter highlights the lack of genuine student engagement in the interprofessional education placement. While students did not explicitly frame their disenchantment as a product of poor curricular design (they are, after all, not necessarily charged with the language of ‘constructive alignment’ and ‘vertical and horizontal integration’), their experiences pointed to a lack of preparation for how to engage in the interprofessional education placement objectives. Very early in their program, they had made decisions that interprofessional practice, including team work and communication, were skills peripheral to the core business of ‘doctoring’. The lack of assessment of interprofessional competencies in the academic context, and again the lack of summative assessment of these skills in the workplace setting, served to reinforce to students that they should invest their learning energies elsewhere. The six curricular features presented in Table 20.3 may help educators to reflect on ways of designing the curriculum to better develop students with capacities to work and learn with others in practice.

20.4 Summary and Where to Next

In drawing on the literature, and on our own study of an initiative designed to promote interprofessional learning and practice in medical students, it is clear that most people consider interprofessional practice as important for effective patient care.

What our own study brought to light was that acquiring these skills was not seen as an immediate priority for students, compared to the ‘hard’ knowledge and skills of medicine. A placement experience designed to promote development of these inter-professional capacities needs to be better designed than the somewhat ‘hopeful’ placement that was available for students in the study. Students reported that the lack of structured activities, the lack of legitimate teaching invitations from other practitioners in the workplace and the lack of summative assessment all contributed to their limited interprofessional experience.

Within the placement, there was no formal assessment that linked to the inter-professional education, or interprofessional practice experience, nor were their learning objectives of observation and interaction with other non-medical health professional students and practitioners promoted or mandated. For these reasons, it was only the confident or proactive medical students who actively sought experiences and informal teaching outside their medical supervisor. For example, one student reported following a “blood nurse” on placement to hone his skills in taking blood, but this was an exception within the participating cohort. Many of the findings related to professional identity formation and the strong impulse to work with and be supervised by doctors because that was who students were aiming to become.

The students alluded to the importance of role models within their own profession. The impact of this intra-professional modelling, both the narratives and the demonstrated behaviours, needs to be examined further. We encourage research designs that seek to answer the following questions about interprofessional education:

- To what extent do educators model interprofessionalism in the academic workplace?
- What can other health professionals teach medical students about interprofessionalism-in both the university and clinical setting?
- How do doctors model interprofessional practice within the workplace?
- Are ‘other professionals’ prepared to teach medical students in the clinical setting when they are already over-burdened with clinical and teaching responsibilities?
- How can educators better design a clinical placement model with the aim of promoting (and assessing) interprofessional learning and practice? And what is the impact on short and long term learning outcomes?

What is becoming increasingly clear from the mounting reports on inter-professional education initiatives in health, is that learners and practitioners are more likely to see the value of interprofessional communication and teamwork if they understand, and see for themselves, the positive influence of these practices on patient outcomes (Kent and Keating 2013). Studies that focus on patients’ experience of effective interprofessional practice, as well as impact on health outcomes and workplace efficiencies, are likely to provide a persuasive rationale as to why these skills are worth developing. Engaging learners in the ‘why’ of interprofessional practice early in their curriculum is just as important as the exposure to tasks and activities designed to promote these behaviours. The results from our study suggest that when it comes to a persuasive rationale for interprofessionalism, it may need to come from the practitioner native to the student’s profession. As one student stated, ‘I want to learn to be doctor, so it is only natural that I will watch what they do’.

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Chapter 21

Medical Education

Tim Dornan and Pim W. Teunissen

*I swear by Apollo Physician and Asclepios and Hygeia and Panacea and all the gods and goddesses ... that I will ... hold him who has taught me this art as equal to my parents and to live my life in partnership with him ... and ... to give a share of precepts and oral instruction and all the other learning to my sons and to the sons of him who has instructed me and to pupils who have signed the covenant and have taken an oath according to the medical law, but to no one else.
Hippocratic Oath*

(Lyons and Petrucelli 1987, p. 214)

Abstract Educating the next generation of doctors is closely linked with caring for patients. Everyone learns to be a doctor in and through practice, and it is a basic professional duty of every doctor to help others learn to be doctors. This chapter defines what attributes of medicine shape its contribution to the wider scholarship of practice-based learning. It identifies tensions: Is medical practice applied science, or is it a practice that is informed by science? Is it just biomedical science that is relevant or do behavioural and social sciences contribute? Can art, music, literature, language study or other fields of study usefully contribute to making doctors? We describe admission to medicine, preparation for practice, practice-based learning, and continued learning in practice in ways that might give useful insights to other walks of life. The conceptual

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landscape of medical practice-based learning is broadening from one dominated by psychology to one that derives valuable insights from sociocultural theory. Both conceptual orientations have much to say about what many now regard as the central feature of medical education: Identity development. It is not a smooth incremental process so much as one in which transitions along a trajectory of identity development alternate with periods of identity consolidation. We offer two models developed through our own research that conceptualise medical practice-based learning in its basic and post-basic stages. Medicine's contribution, we conclude, is to show how the expertise of seasoned professionals can be made accessible to novices in a scholarly way under the conditions of twenty-first-century society.

Keywords Workplace learning • Practice-based learning • Clerkship • Residency • Transition • Identity

21.1 Medicine and Medical Education: The Context

According to Cheetham and Chivers (2005, p. 13), a profession is “an occupation **based upon specialised study, training or experience**, the purpose of which is to supply skilled service or advice to others (...) in return for a fee or a salary” (our emphasis). So, education underpins professional practice. The Hippocratic Oath, cited above, shows that doctors have been under an obligation to share learning for over two millennia. The UK General Medical Council (GMC) re-emphasised that obligation in the present age in the following quotation from “Good Medical Practice”. (General Medical Council 2006, pp. 15–19): “Teaching, training, appraising and assessing doctors and students are important for the care of patients now and in the future. You should be prepared to contribute to these activities”. The guidance elaborates the educational duty of doctors as to “develop the skills, attitudes, and practices of a competent teacher”, properly supervise younger colleagues, accurately assess the competence of other doctors, and report it honestly in, for example, references supporting job applications.

This chapter sets out to answer the question “what attributes of medicine shape its contribution to the wider scholarship of practice-based learning?” In doing so, it will argue that medicine is an archetypal profession because it has embraced education as an integral part of practice and has, latterly, made professional education itself a professional practice.

21.1.1 *Historical Perspective*

A tension that has taxed medical education throughout its history is the one between medicine as an academic discipline and medicine as a practice. Jolly (1998, pp. 173–4) noted that Universities like Oxford and Cambridge had no requirement or facility for a clinical component to medical education in the sixteenth century. Practice was the menial work of barbers. Over the ensuing centuries, academic and practical

components gradually came together until a landmark report on the state of medical education in the United States and Canada authored by Abraham Flexner in the early twentieth century formalized their relationship (Dornan 2005). Awareness was growing that medicine was not serving society as well as it could. At the same time, the germ theory of disease was providing medical scientists and doctors with more effective weapons and moving medicine from a purely empirical basis to scientifically founded practice. Andrew Carnegie's charitable foundation tasked Flexner, an educationalist whose brother was a leading biomedical scientist, to report on how medical education could be improved. With the publication in 1910 of Flexner's report, "Medical education in the United States and Canada", medical education and practice were indelibly stamped with features that characterize them to this day. Flexner (1910, p. 20) attributed the poor quality of the physicians being produced by medical schools at the turn of the twentieth century to a progressive shift from preceptorship learning to didactic teaching of a set of doctrines. Patients had lost their crucial place in learning medicine. Flexner's aim was for a medical student to rely "no longer altogether on the senses with which nature endowed him, but those senses made infinitely more acute, more accurate, and more helpful by the processes and the instruments which the last half-century's progress has placed at his disposal." Those processes and instruments were provided by biomedical science. Medical schools should be research-active university departments with full-time staff. Entry requirements should be high. After preclinical grounding in scientific disciplines, clinical education was to take place through participation in apprenticeship hospital attachments, supported by bedside teaching. It was possible for theory and practice to be closely linked at that time because the same scholar physicians taught science in laboratories and practice in the hospital wards of leading institutions in early twentieth century America.

Flexner's curriculum design set what became an international gold standard for the relationship between theory and practice that is apparent to this day in theory-to-practice curricula and a dominant discourse of "medicine as applied science". Departures from the Flexnerian model have mostly been in the development of graduate education, which did not exist in any formal way in his day.

21.1.2 Medical Education

Having noted some similarities and differences between historical and contemporary educational systems, we end this section with a factual description of the practices of medical education and medicine as they exist today.

21.1.2.1 Before Admission

Different countries have different policies about admitting direct from secondary school, requiring foundation degrees, or having mixed entries. In North America, for example, medicine is an exclusively graduate study whilst Britain has undergraduate

and graduate entry streams, and mainland Europe requires bachelor studies of Medicine at the undergraduate level before qualifying as a “doctor” after completing a masters degree. Whatever the system, it is customary to call education up to the level of qualifying as a doctor “undergraduate medical education”.

If bioscience underpins medicine, it follows logically that understanding the chemical processes that underpin bioscience is prerequisite. Foundation knowledge in chemistry, then, is a requirement for entry to medicine in at least some countries. The sciences of “whole people” like psychology and sociology are seen as less important than sciences of those people’s body parts. Humanities are given even less credit, but recognition is slowly dawning that they too can contribute to the education of humane practitioners.

21.1.2.2 Admission

Medicine is so popular that medical schools can take their pick from people entering higher education. How to pick is less easy. Good academic performance is necessary, but opinions vary about whether it is sufficient and whether other attributes can and should be assessed. North America and Australia led the way in developing aptitude tests – the Medical College Admission test, and Graduate Medical School Admission Test respectively – which provide (inter)national standard measures of reasoning to supplement measures of competence brought forward from secondary or earlier tertiary education. The quest for measures that go beyond cognitive competence to professional and personal attributes has been particularly vigorous, given that it is important for doctors to be able to relate to patients and uphold rigorous ethical standards. These have included personality tests, measures of emotional intelligence and, of particular importance, interviews. The quest for reliability has moved interviewing procedures towards ones that draw conclusions from multiple small samples of performance in a circus of interview stations – so-called “Multiple Mini Interviews” (Siu and Reiter 2009). Many countries have introduced procedures to increase the diversity of medical school applicants and help less privileged people consider themselves as candidates for what might otherwise seem an unattainable career goal.

21.1.2.3 Curriculum Design

Undergraduate Medical Education

Undergraduate medical curricula last between 3 and 7 years. As laid down by the Flexner report, they have traditionally had a so-called “H-shaped” curriculum design. They begin with scientific study and little if any exposure to practice. After a more or less abrupt transition approximately midway through curricula (which

represents the cross-bar of the H), students move from lecture theatres and laboratories to wards, outpatient departments, and primary care physicians' offices as contexts in which to learn from and to practice. There is an emphasis at this stage on developing skills as well as knowledge. Meanwhile, students are exposed to practitioners espousing and (ideally, at least) modelling the ethical and moral basis of practice. Medical students function as clinical apprentices and transfer what they have learned in earlier years to the contexts in which they have to put their learning into practice. After tests of their knowledge and skills, they are awarded a final medical degree and a license to practice. Throughout undergraduate medical education, universities are responsible for the assessment and evaluation of education, though health provider organisations collaborate in providing opportunities for practice-based learning.

In recent decades many medical schools have adopted “Z-shaped” curricula, which have a less abrupt transition from theoretical to practical medical education. In accordance with constructivist didactic principles, learners are given opportunities to put abstract principles into practice in what would have been the “preclinical” phase of a Flexnerian curriculum. Integrated courses of theoretical education are coupled with relevant practical experiences in laboratories or clinical workplaces. Practical aspects of education progressively increase relative to theoretical components.

Postgraduate Medical Education

A period of graduate education as a “resident” is now mandatory in all medical subspecialties worldwide. The duration of residency varies, as does the extent to which universities or academic bodies affiliated to health care services oversee the process. In the UK, for example, some universities provide masters and doctoral education for residents but postgraduate medical education is, otherwise, provided, assessed, and evaluated by “Deaneries”, which report to a central regulatory body. In the USA and many other countries, by contrast, graduate education is provided by the same universities that provide undergraduate education. In both systems, residency lasts 3–8 years. Residents progress to the status of independent practitioners on the basis of time served, observed performance in practice, and formal assessments. Increasingly, such assessments are administered in workplaces, using multiple samples of performance of authentic tasks as measures of proficiency. There may also be formal tests of skills and knowledge outside workplaces. Up to this point, doctors are not allowed to practice independently or privately, and are not allowed to supervise other doctors. Once certified fit for independent practice, it is normal for doctors to become supervisors of medical students and doctors in training. Graduate education does not end with specialist certification. Participation in programmes of continuing professional development (also called continuing medical education) is now required of all specialists. Moreover, licensure may be time-limited and subject to periodic re-assessment of proficiency.

21.1.2.4 Lifelong Learning and Transitions

Whilst medical education is often described as a lifelong continuum, the career trajectory from medical student to postgraduate trainee and onwards to independently practising medical specialist is, in reality, divided into distinct stages. According to Petersdorf, the components of medical education are like children's building blocks, "piled one atop of another to make a tower that from a distance may look like a coherent whole, but a closer perspective reveals the discrete nature of the components and a fragmented overall structure" (Petersdorf 1994). The times when learners move from one phase to the next are distinct transitions. Learning can be repetitive and disjointed rather than incremental. For instance, learning about diabetes for a written exam in the first curriculum year requires different learning skills from learning about the treatment of diabetes when you are a clerk in a busy outpatient clinic. Education research shows that medical education does not prepare learners to move easily from one stage of their careers to the next one. And there still remains the problem of helping fully trained specialists learn from their ever-changing practices (Teunissen and Dornan 2008).

21.1.3 Medical Practice

Even the most technical aspects of medical practice must be based on a strong moral foundation, which emphasises the autonomy of patients and the ethical obligation of practitioners to support their autonomy. The UK GMC is unequivocal that the primary duty of a doctor is as follows:

Patients must be able to trust doctors with their lives and health. To justify that trust you must show respect for human life and you must make the care of your patient your first concern (Ref: GMC – Duties of a Doctor)

Licensure and the ability to earn a livelihood depend on adherence to a code of moral conduct, which is strictly enforced. A doctor's responsibility, it has been argued, is not to make altruistic personal sacrifice on the behalf of patients, rather to have a pro-social orientation, which includes taking care of oneself so as to be fit to take care of others (Burks and Kobus 2012). Sutton and colleagues (2011, p. 11) wrote that mutual trustworthiness provides an important foundation for doctor-patient relationships and explored how the principle of trustworthiness could be extended to the triadic relationship between patients, specialists, and doctors-in-training. They concluded that "the educational process itself should help learners examine the moral basis of medical practice" (Sutton et al. 2011, p. 15), emphasizing the close parallel between doctors' therapeutic relationships with patients and their educative relationships with medical students and doctors-in-training.

It is hard to generalize across medical subspecialties, whose tasks are as varied as performing microsurgery, looking after populations of people, and caring for people who are dying, but they have in common highly-developed underlying

knowledge-bases, a need to use knowledge within complex reasoning processes that lead to potentially high-stakes decisions, and an ability to function in one-to-one relationships and in team settings. Complex psychomotor skills are needed in an increasing number of specialties because technology is providing many novel “minimally invasive” diagnostic and therapeutic procedures. Dextrous procedures are no longer the preserve of surgeons.

21.1.4 Potential Significance to Other Walks of Professional Life

One answer to the question “what attributes of medicine shape its contribution to the wider scholarship of practice-based learning?” is that it is a profession that calls for the application of complex knowledge and skills within strongly social contexts of one-to-one and collaborative relationships. It is similar to other health professions in having a strong ethical imperative to work to the benefit of patients, but differs in being the health profession *par excellence* in which practitioners are expected to craft knowledge-rich solutions to unique and complex situations rather than work solely in conformity to norms of practice. Medical problems can be not just complex, but unpredictable in their behaviour and it is not at all uncommon for doctors to be faced by diseases or situations that have never before been described. Technological advance both shapes and is shaped by practice but practice is essentially located within human systems, as illustrated by the most technically proficient surgeons achieving suboptimal patient outcomes if they cannot behave in a reasonable way with the other people who work with them in operating theatres.

21.2 The Conceptual Landscape

21.2.1 From Positivism to Constructivism

This section aims to answer the question: “How is learning medicine conceptualised?” The philosophical background to the Flexner report was a positivist one. According to Guba and Lincoln (2000), positivism assumes external realities “exist” independently of the people who apprehend them. That fitted the era in which Flexner wrote his report, which was a time when biomedical sciences were showing themselves able to increase ‘real’ medical knowledge so dramatically. Flexner’s epistemology shifted the task of students away from being “parrot-like, to absorb” to a very different one (Flexner 1910, p. 21). As Ludmerer explained, “the aim of medical education had to be that of instilling proper techniques of acquiring and evaluating information, rather than merely inculcating facts through rote memorization” (Ludmerer 2011). Instead of a sole focus on lectures and textbooks, medical

education moved towards active participation in laboratories and clinical clerkships; “a generation before John Dewey, medical educators were espousing the ideas of what later came to be called ‘progressive education’” (Ludmerer 2011). Dewey conceptualised experience as the starting principle for learning and development. He believed that active engagement in practice helped learners gain applied rather than abstract knowledge (Yardley et al. 2012). A progressive shift towards an outlook on learning that “can be seen as a process whereby learners actively construct their understandings based on previous experience, knowledge, and their perceptions of the world” has remained a driving principle in medical education since then (Mann et al. 2011).

21.2.2 Theoretical Orientations

Theoretical orientations that have influenced medical education have been as varied as the backgrounds of those involved in medical education, but three strands have had major influences on the study and conduct of medical practice-based learning: Cognitive psychology, as exemplified by skills training and problem based learning; cultural-historical learning theory, with a particular emphasis on communities of practice theory; and vocational workplace learning theories.

21.2.2.1 Cognitive Psychology

Cognitive psychology has influenced many aspects of medical education. It focuses mainly on mental processes involved in learning and fits with a constructivist perspective in that it views learning as an active process. Areas in medical education that have both benefited from and contributed to the literature on cognitive psychology are expertise development, clinical reasoning, reflective learning, and self-directed learning. A good illustration of cognitive psychology’s influence is problem-based learning (PBL), which was first introduced at McMaster University, Canada, in 1969 and has been adopted around the globe since then.

According to Schmidt et al. (2011), the defining characteristics of PBL are:

1. Problems are used as triggers for learning;
2. Students collaborate in small groups for part of the curriculum;
3. Learning takes place under the guidance of tutors;
4. Curricula includes limited numbers of lectures;
5. Learning is student-initiated, and
6. Curricula offer ample time for self-study

The level of students’ prior knowledge strongly influences their learning. For them to build on their knowledge, it must be activated, which is done by presenting them with problems that ‘trigger’ their learning. One way of achieving that is to make problems interesting and motivating. For instance, a visit to a patient at home

may throw up several meaningful problems that present students with manageable challenges. Prior knowledge on the topic will help them create meaning as they interact in small groups to try to solve the problem together. As they do so, they form mental models of the problem, elaborate on them and, by using various resources, look for possible explanations and solutions. “Moreover, as the learners’ preconceptions are activated, they become more easily able to identify gaps in their prior knowledge, thus enabling better learning to take place” (Schmidt et al. 2011). PBL fits well with cognitive perspectives on knowledge development. It is hypothesised that, for their knowledge to be effective and available for use, individuals create elaborate networks (Schmidt and Rikers 2007). Elaboration is promoted by group discussions, teaching peers, reading, gaining additional experience with other facets of problems, or reflecting on it.

One of the challenges for PBL curricula is to help students develop transferable knowledge and skills. Although PBL was developed with the assumption that transfer occurred quite readily, it is now clear that both teachers and learners have to build in educational activities that promote transfer. In a similar vein, PBL was once thought to develop generalized problem-solving skills but research has shown that problem-solving skills are context specific. Mann, Dornan, and Teunissen explain that “looking for underlying concepts and principles can be strengthened by effective tutoring; for example, by encouraging students to compare the current case with others in their experience or think of other examples that reveal similar concepts” (Mann et al. 2011). Elaboration of knowledge based on clinical experience can also be facilitated by a good match between a clinical clerkship and the content of the PBL case, effective tutoring, and the self-directedness of the student (O’Neill et al. 2002). Cognitive psychology provides a theoretical orientation for much contemporary research in clinical reasoning, the acquisition of skills, and their transfer from training to practice context. As an example, McConnell and Eva took a cognitive perspective to examine how emotion affects the processing of information and its transfer between learning and practice situations (McConnell and Eva 2012).

21.2.2.2 Cultural-Historical Learning Theory

The origins of cultural-historical learning theory can be traced back to a group of Russian psychologists in the 1920s and 1930s, led by Lev S. Vygotsky (Engestrom and Miettinen 1999, pp. 1–16). In what is now referred to as first-generation cultural-historical activity theory (CHAT), but is also called socio-cultural theory, Vygotsky positioned activity as the “general explanatory category of psychology” (Roth and Lee 2007). Luria and Leont’ev further clarified the nature of this category in the second generation of CHAT. They proposed that all human activity is “motivated by the need to meet a goal, or object” (Roth and Lee 2007). According to Wertsch, del Rio & Alvarez, the goal of a “sociocultural approach is to explicate the relationships between human action, on the one hand, and the cultural, institutional, and historical situations in which this action occurs, on the other” (Wertsch et al. 1995, p. 11). Engeström developed an ‘activity triangle’, shown in Fig. 21.1, to investigate an

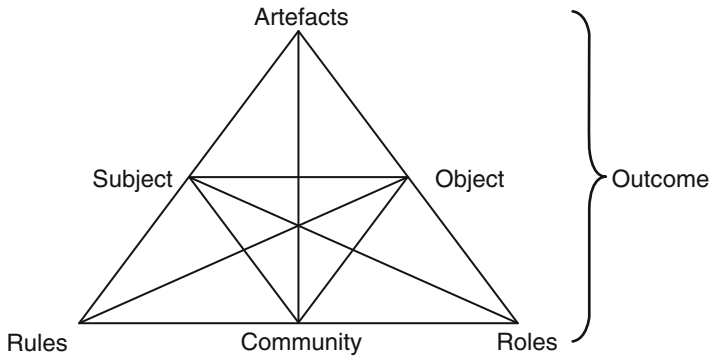


Fig. 21.1 Activity triangle

activity system (Engeström and Miettinen 1999, pp. 19–38). It shows how activity exists in an interrelationship between an individual or group (subject), the objectives they have, their roles and pertinent rules in a community, and the artefacts that mediate activity. Together, this complex interaction leads to outcomes at different levels and with potential consequences for further subsequent activities.

Socio-cultural learning theory makes it possible to consider the development and functioning of medical students and doctors without divorcing them from their specific social contexts and is thus a social constructivist theory (Mann et al. 2011). Therefore, it helps explore students' and doctors' practice-based learning. As medicine is an old profession that has become more complex with time, it seems self-evident that the cultural, institutional, and historical situations in which actions occur should be taken into account. De Feijter et al. (2011) exemplified the use of cultural-historical activity theory when they studied the activity system in which final year medical students learn about patient safety. Using CHAT to guide their analysis, they found that two main activities were important and each had a clear goal: learning to be a doctor; and providing safe patient care. Those two activities could, at times, create contradictions when the rules and division of labour of one activity adversely affect the other one. Contradictions in roles and rules could give rise to unsafe situations, which caused stress for students who had to manage the two activities simultaneously, whilst also stimulating reflective learning (De Feijter et al. 2011).

21.2.2.3 Communities of Practice

Another, related, perspective on practice based learning is Lave and Wenger's work on communities of practice (CoP) and legitimate peripheral participation (Lave and Wenger 1991; Wenger 1998). As in CHAT, learning is viewed as situated, which means that it "is an integral and inseparable aspect of social practice" (Wenger 1998).

But where CHAT provides a structured approach for understanding aspects of, or problems within, activity systems, Lave and Wenger's work focused specifically on the relation between novices and experts in CoPs, which they defined as a "set of relations among persons, activity, and world, over time" that result from collective learning in the "pursuit of a shared enterprise" (Lave and Wenger 1991; Wenger 1998). Newcomers' participation alongside more experienced community members stimulates an exchange of knowledge and a negotiation of meaning between members resulting in the ongoing reproduction of a CoP. Like activity theory, CoP is a social constructivist theory.

After studying a number of apprenticeship situations, from Vai and Gola tailors in West Africa to U.S. Navy quartermasters, Lave and Wenger proposed legitimate peripheral participation as a descriptor of how practices are made accessible to newcomers (Lave and Wenger 1991). Initially, they are introduced by, for instance, being allowed to observe tasks, participate in low-risk ones, or perform more skilled ones under close supervision. This peripheral participation provides an entrée into practice that has to be accompanied by enough legitimacy for newcomers to be fully engaged. If, for whatever reason, a CoP does not open up, then "inevitable stumblings and violations" become a "cause for dismissal, neglect, or exclusion" rather than opportunities to learn (Wenger 1998). Through their participation in a CoP, newcomers develop along personal trajectories towards the kind of full participation that is characteristic of experts. Research on learning in operating theatres and on trainees' participation in internships suggests that situated learning theories, and the specific focus of communities of practice and legitimate peripheral participation on the development of newcomers, can be valuable for understanding medical workplace learning (Lyon 2004; Sheehan et al. 2005). For instance, conceptualising learning in the operating theatre as a social process allowed Lyon to show that medical students find learning most valuable when they engage in the practice of surgery by "getting involved, standing scrubbed in at the table, rather than being removed from it as passive onlookers." To become 'full participants', "students use strategies to promote themselves to gain the surgeon's trust and to gain legitimacy by presenting themselves as deserving students, showing interest and intent, motivation, professional behaviour and respect" (Lyon 2004). A more recent example of how CoP has been able to inform medical education research is a study of patients' involvement in medical student teaching encounters (McLachlan et al. 2012). Patients, the study showed, were participants in the practice of patient care, but did not usually see themselves as anything more than learning objects in the practice of medical education. An ability to make those two practices overlap with one another, the study showed, is an attribute of effective workplace clinical teachers.

21.2.2.4 Workplace Learning Concepts

Originating in the study of vocational learning of, for instance, nurses, hairdressers, and metal workers, there is a line of social constructivist research that has conceptualised workplace learning in a way that is very significant to medical practice-based learning.

Eraut contributed by emphasising that much learning at work, even in an educational context, occurs outside formally organized and delivered curricula. He describes informal learning as taking place “in the spaces surrounding activities and events with a more formal educational purpose” (Eraut 2004). This situation is typical of many learning events in medicine where doctors and students engage in clinical activities, often without a distinct educational purpose in mind. Working with patients and discussing cases with colleagues informally helps them learn medical knowledge, social norms, traditions, and attitudes. In this way, informal learning is closely linked to tacit learning, which Reber describes as “the acquisition of knowledge, independent of conscious attempts to learn and in the absence of explicit knowledge about what was learned” (Reber 1993). “In general, four types of activity can be distinguished that have a high potential for learning: participation in group activities, working alongside others, tackling challenging tasks, and working with patients” (Eraut 2004). The very nature of implicit learning makes it difficult to recognize. Doctors don’t notice the resulting knowledge or regard it as part of a person’s general capability rather than something that has been learned. This is problematic because, although they might be aware that they are learning by doing, both learners and teachers find it difficult to maximize workplace learning (White and Anderson 1995).

From an educational viewpoint, the complexity of everyday medical practice, which is not geared to teaching, may appear to be unstructured, unintended, and opportunistic. However, as Billett explains in his work on practice-based learning, that is not the case. The participation of medical students and doctors in medical practice is structured by the goals of specific workplace. Obstetrics, for instance, is a very different milieu than dermatology. Billett argues that “workplaces will invite workers to engage and learn, insofar as that participation serves its goals and/or the interests of those within it, that is the continuity and/or development of the workplace or affiliates or individuals within it” (Billett 2006). In this respect, every workplace has a ‘workplace curriculum’, which affords learners opportunities to move along particular learning trajectories in the time they spend there (Billett 2004a). Opportunities for engagement and expectations depend on the workplace as well as the learner. Clearly, the learning trajectory will be different for a medical student than for a newly hired medical specialist. And individual learners play an active role in choosing what activities they participate in and how. But looking at medical practice from the viewpoint that it is structured, although usually not for education, and that learners are afforded different trajectories of learning, helps medical educators disentangle practice-based learning. Jha and colleagues, in recent research, related the concept of a ‘workplace curriculum’ to workplace based summative assessment procedures (Jha et al. 2012).

After reviewing the importance of identity formation in the trajectories of doctors’ learning, the next section relates these different concepts to different phases of the medical education trajectory in order to get a comprehensive overview of medical practice-based learning.

21.3 Identity Formation

This section introduces identity formation as a central concept in practice-based learning, and explains how doctors-to-be strive to resolve, or at least handle, various tensions as they form their professional identities. Whilst recognising that learning to be a doctor is, in reality, a discontinuum with “transitions” between successive stages, we will argue that discontinuity can open up positive learning opportunities as well as pose unhelpful challenges (Teunissen and Westerman 2011a).

Students typically encounter the theory-practice tension on the day they enter medical school. A doctor, senior in years and avuncular in manner, gives a pep talk, explaining that medicine is as much an art as a science. Almost in the same breath, students are told of the scientific education they must follow for 3 years or longer before they can come into contact with the art of medicine. Other tensions are in the curriculum content. An increasing number of disciplines jostle with one another for space in crowded curricula. Behavioural and social sciences, often regarded as ‘soft sciences’ and minority partners in curriculum development, are amongst those disciplines. Even though social sciences are given curriculum space, students may pick up biomedical scientists’ negative attitudes towards them and their place in medical curricula. And there are tensions between biomedical scientists, who may have been detailed to teach medical students because their research performance was poor, and doctors, who command higher salaries and status. The theory-to-practice curriculum design inherited from a century ago, remember, was predicated on laboratory scientists teaching the early curriculum years being the same people as the expert clinicians who teach at the bedside. No longer! Few teachers of medical sciences are medically qualified, let alone expert clinicians.

Whilst Flexner’s (1910) recommendations formalized undergraduate medical education, residency has come into existence and been formalized over the century since then. That has been made necessary, partly by the increasing complexity of medical practice, partly by it becoming unacceptable for doctors to learn by trial and error, and partly by the current climate of accountability. Here, again, there are tensions – between off-the-job and on-the-job education, and between workplace learning and workplace assessment. One easy way of showing education is being delivered is to provide (mandatory) off-the-job education, often in the form of large group teaching. Eraut has argued, however, that the most important learning of any practice takes place on-the-job (Eraut 2004). An important breakthrough was the demonstration by Norcini et al. (1995) that multiple low-stakes assessments of competence on-the-job could take the place of high-stakes off-the-job assessment. So, workplace-based assessment came to assume the prominence it now has in medical education. There is an inherent complication, however, in a supervisor being judge of a resident’s proficiency and the same supervisor being a professional colleague in patient care and a partner in what Wearne et al. (2012) have termed an ‘educational alliance’. The development of simulation techniques to train technical medical skills has gone some way towards resolving those two tensions. It makes good sense

to train and test technical skills (e.g. skills in operative surgery) *in vitro* before allowing learners to apply them *in vivo*. Simulation is taking an increasingly important place in medical practice-based learning, particularly in specialties that require complex psychomotor skills though the best balance between low-fidelity simulation, high-fidelity simulation, and real practice remains to be identified. High-fidelity simulation models do not currently outperform low-fidelity ones. Perhaps that is because different simulation models are not sequenced to best effect (Norman et al. 2012).

Important as technical proficiency is, the importance of “non-technical” skills, has come to be recognized, even in very technical specialties. Whereas surgeons who were deft technicians but lacked interpersonal skills were formerly tolerated or even celebrated, it is now clear that their lack of interpersonal skills has an adverse effect on patient outcomes. The human qualities of doctors – values, emotions, interpersonal skills, and adherence to the underpinning moral precepts of medicine – are important, whatever their specialty.

The net result of these various forces, operating on an educational field with such a rich culture and history, can be seen in a number of contemporary trends in medical practice-based education. Whilst the emphasis on science remains strong, there is a move towards what Kuper and d’Eon (2011) termed “curriculum transformation” and “rethinking the basis of medical knowledge”. There is recognition that affects – particularly emotions – are important components of medical expertise, alongside knowledge and skills (Helmich and Dornan 2012). Competency frameworks have been developed to emphasise that doctors must be professionals, communicators, and collaborators as well as medical experts (Frank and Danoff 2007) and curriculum outcome frameworks are being promoted to make doctors’ development of professionalism measurable (Cooke et al. 2010).

21.3.1 Discourses of Competence and Identity Development

Reviewing identity, identification, and medical education, Monrouxe (2010) wrote: “Medical education is as much about learning to talk and act like a doctor as it is about learning the content of the medical curriculum.” Individuals, she continued, have multiple identities and there may be dissonance between them, which gives rise to powerful, negative emotions. Identity dissonance has been proposed as the cause for a worrisome decline in empathy and idealism and increase in cynicism that has been observed as medical students move from the science to the practice phase of their education and progress towards qualification (Griffith and Wilson 2001; Testerman et al. 1996). The term “hidden curriculum” is used to describe the informal interactions between students and staff, which are observable in students’ accounts of their learning (Gaufberg et al. 2010) and have been blamed for creating identity dissonance and loss of idealism. The problem was laid bare by a Foucauldian analysis of medical students’ and teachers discourses of curriculum (MacLeod 2011). Medical students developed their identities as doctors within two competing discourses: a discourse of competence and a discourse of caring. The discourse of

competence tended to be privileged whilst the discourse of caring was marginalized. The discourse of competence was associated with biomedical and clinical issues while the discourse of caring was associated with social issues. MacLeod went on to describe how medical students constructed their identities by demonstrating themselves to be confident, capable, and suitable to be doctors in relation to the discourse of competence. In contrast to the privileged discourse of competence, students constructed caring identities by showing themselves to be benevolent and humble. MacLeod's discourse analysis (MacLeod 2011) brings this review of tensions in medical education to a close by showing how, for all the efforts made by curriculum designers to provide balanced and transparent education, social, historical, and institutional forces have a strong hold on professional learners' identity development and the influences they are subject to.

The next section introduces the topic of (dis)continuity in professional practice-based learning and examines individual transitions in detail.

21.3.2 Growth Towards Independent Practice and Transitions

In the course of their medical training, students change from being passive observers to bearing ultimate responsibility for patient care as a medical specialist. The first major transition occurs when non-clinical medical students start the clinical part of their training. At the periphery of practice, they get first-hand experience of what it means to be a patient and what it takes to be a doctor. There is a second transition when graduated students start taking (supervised) responsibility for the care of patients as specialist trainees ("junior doctors"). A third transition takes place when specialist trainees finish postgraduate training and tackle the demands of posts as medical specialists. A transition, which can last for months, results from individuals moving from one set of circumstances to another (Nicholson 1984).

New circumstances, such as starting at a new workplace, bring a variety of challenges. After physically coming to know your way around comes the more difficult task of learning the social and cultural norms of your new workplace, of identifying the expectations of others, marrying them with your own, and learning new knowledge and skills to be able to live up to new tasks. In the three major transitions mentioned above, medical students and doctors appear to cope in different ways. There is compelling evidence that a large proportion of (student) doctors experience transitions negatively. They experience levels of stress and negative emotions, which have an adverse effect on their performance (Bogg et al. 2001; Brown et al. 2009; Helmers et al. 1997).

Each major transition has its own challenges. Reviewing the literature, Teunissen and Westerman (2011b) showed that almost half of all students find the transition from preclinical to clinical education too abrupt. Their main stressor is understanding their workplace roles and responsibilities, which exemplifies the clash between the learning orientation of medical school and the performance orientation of practice-based learning (Teunissen and Westerman 2011b). Suddenly, they need to take full responsibility for their own learning in a way that was not taught or learned

in medical school. Most students feel uncertain if they have what it takes to ‘fit in’ because they lack clinical skills and find it hard to apply theoretical knowledge to clinical reasoning, although PBL curricula go some way towards mitigating those problems (Westerman et al. 2010).

The transition from clinical student to resident is no less intense. Research shows that about a quarter of junior doctors experience high levels of burn-out on the Maslach Burn-out Inventory (Bogg et al. 2001). As well as being very challenging, research shows that this transition is also a time for rapid personal development. Lempp and colleagues, for instance, found that junior doctors in this phase develop strategies to help them cope with everyday clinical practice and take on more professional responsibility in relationships with patients (Lempp et al. 2004). Medical schools have begun to respond to those difficulties by offering their students induction courses to learn specific skills or help them cope with the new demands of major transitions.

One might expect that reaching the goal you have been working towards for 10–15 years would result in a feeling of accomplishment but the third major transition – from specialist trainee to licensed medical specialist – is a time of mixed feelings as well. After many years of supervised practice, new medical specialists find themselves wanting in a variety of aspects. They lack teaching skills, are unfamiliar with being clinical supervisors, and lack competence in managerial and financial aspects of running a medical practice (Westerman et al. 2010).

Jarvis-Selinger et al. explored how learners develop their identities as they progress through medical curricula. Like Teunissen and Westerman (2011a), they described identity formation as taking place over a series of qualitatively distinct and discontinuous stages. Rather than learners progressively developing the identities of doctors, they develop (and then have to leave behind) the identities of university student, clerk, resident, and eventually specialist. Changes in identity are precipitated by emerging crises, which arise as a result of discrepancies between individual people’s understandings of themselves in their professional role, and the experiences and challenges their situation confronts them with (Jarvis-Selinger et al. 2012). Looking at transitions as inevitable life-events that coincide with different life-phases calls for a different approach from the present one. Instead of trying to eliminate transitions by making the differences between successive phases smaller, or introducing induction courses, medical education is beginning to look into ways of preparing future doctors for the sure struggles that lie ahead (Teunissen and Westerman 2011b). Optimally preparing individuals for a transition is a matter of helping them cope with changes, recognise learning opportunities and take responsibility for their own learning processes and outcomes (Hannon 2000; White 2007).

21.4 Models of Practice Based Learning in Medicine

Up to this point in the chapter, we have explored historical and other forces that explain why medical education is as we know it today. We have explained characteristics of the practice of medicine, the practice of medical education, and the

relationship between the two. We have done that so other professionals can examine similarities and differences between their own practices and ours, and perhaps derive useful insights. We now move firmly in the direction of educational practice, proffering approaches that are directly applicable. We describe how we have synthesised models of practice-based learning from the empirical research of ourselves and others in undergraduate and postgraduate medical education. There is, of course, a danger that doing so will simply embed weaknesses of current educational practice. The research on which our model-building has been founded, however, seeks not to idealise but to analyse practice. It seeks to make more explicit those parts of educational practice for which there is research evidence of benefit. Much of it comes from qualitative research, whose ability to illuminate causal mechanisms has made model-building possible.

The scholarship of medical education owes more to the social than the biomedical sciences so the research we draw on is well theorised. Its central assumption is the social-constructivist one that people construct knowledge by interacting with the world. Human activity in all its complexities is what gives meaning to things and situations. People learn from contextualised activity so their learning is historically, culturally, and socially laden. Accordingly, learning is a social process. As Kim explained “it does not take place only within an individual, nor is it a passive development of behaviours that are shaped by external forces. Meaningful learning occurs when individuals are engaged in social activities” (Kim 2001).

There is an important distinction between learners who are not yet licensed to be members of a clinical workforce – medical students, who have a peripheral relationship with practice – and learners who are members of a workforce – residents and trained specialists. Legally, undergraduate education has to be separable from patient care, because medical students are not allowed to take responsibility for patients other than under very close supervision. Residents and trained specialists do take responsibility for patient care (albeit under supervision in the case of residents) so there is a clear legal distinction between the learning of unlicensed students and licensed doctors. The distinction is not solely a legal one because there are important empirical and theoretical differences between the ways those different groups learn. Therefore, they are treated separately in the discussion that follows. For each category of learners we describe:

- What *conditions* influence learning?
- What learning *mechanisms* operate?
- How do those processes affect learning *trajectories*?

21.4.1 Professionals Learning Within Practice

21.4.1.1 What Conditions Influence Learning?

‘Learning by doing’ is the easiest way of describing how medical professionals learn in and from practice. But this often-used term does not explain how they learn by doing. This section explores the topic (Teunissen et al. 2007b; Watling et al.

2012). Watling et al. and Teunissen et al. both studied qualitatively how junior doctors and specialist trainees learn and concluded that the foundation of their learning was “the clinical work itself: learning occurs through the accumulation and processing of clinical experiences” (Teunissen et al. 2007b; Watling et al. 2012). There is a difference, however, between the degree of autonomy of residents and trained medical specialists in deciding how to shape their practice and, consequently, their learning. Whereas the training of residents is governed by the requirements of professional societies and/or governmental bodies, medical specialists are freer to organise their lifelong learning activities. There has been a shift in residency education over the last 15 years from no process requirements, or very general ones (e.g. only stating for how long and where training should take place), towards outcome-based curricula (Scheele et al. 2008). Working in supervised practice for a specified number of years is no longer regarded as sufficient evidence of specialist training. Wallenburg et al. have conducted a comparative historical-institutional analysis of postgraduate medical training reform in the United Kingdom and the Netherlands. Although there are political and institutional differences between the two countries, “medical professional bodies had to give up their monopoly in professional training and increasingly had to share power with other stakeholders” in both the United Kingdom and the Netherlands (Wallenburg et al. 2012). This greater transparency and accountability will likely also affect specialists’ continuing education in the future.

One of the results of the reform of practice-based learning for specialist trainees and a growing number of medical specialists, is the formalisation of learning activities and assessment. For instance, in specialist training, assessment programs have been introduced that make use of different tools, often based on structured observation and feedback clinical practice, to support and monitor trainees’ learning (Van der Vleuten et al. 2012). The information gathered in this way, is collected in a learning portfolio that is supposed to guide further educational activities, tailored to the needs of individual learners.

Shah and colleagues (2014) conducted detailed qualitative research into residents’ learning from clinical work. They found that learning almost always started from the care of some individual patient and rarely from formal educational activities like day-release courses. Organisational features of learning environments both afforded and, at times, constrained residents’ learning. Workload was a simple example. Respondents described how either insufficient or excessive workloads constrained their learning because it provided insufficient stimulus on the one hand, or overwhelmed them on the other. The relationship between affordances and learning outcomes was further complicated by attributes of trainees, best exemplified by the relationship between trainee seniority and the complexity of patients’ clinical problems. What might be an overwhelmingly complex case for a junior trainee to handle could be a very positive educational stimulus for a senior one. The attribute of trainers that most strongly influenced learning was, unsurprisingly, their capacity to engage in warm, supportive, and stimulating social relationships with learners.

21.4.1.2 What Learning Mechanisms Operate?

The practice-based learning of residents and specialists is mostly informal and implicit because only those activities that are directly relevant to healthcare tend to be made explicit. Learning results from social interaction within communities that have long and strong biomedical traditions of focusing on the value of evidence-based truths, knowledge, and tangible skills. A quote from a participant in a study on clinical supervisors' views on trainees' practice-based learning illustrates nicely that clinical supervisors don't think in terms of education but in terms of doing your job and assuming that learning will be a by-product of wanting to do it well (Teunissen et al. 2007a).

'So in the morning the residents come to the hospital and eh, when they're scheduled on the delivery ward, then eh... Well if they didn't do any deliveries then they watch someone else do one, but at some moment they're going to manage that delivery their selves [sic] and from that perspective they learn by doing as they go along. The realistic impression of things is that they are learning while working.'

A model that describes how people develop in such a complex system requires contributions from both cognitive and social practice-based learning theories. What ties together most medical education research in this area is that researchers have drawn on a variety of other research fields to explain the phenomena they observed. This has led to a patchwork conceptual framework at multiple levels, from the mental processes involved in memory, emotion, and action to the historical and sociopolitical influences on the state of healthcare provision and education. Medical education researchers have found concepts that could be applied to medical education at different places along this continuum. Academic fields ranging from cognitive to social psychology and situated cognition have contributed. Where the contextual and social conditions have been a researcher's focus, sociology and anthropology have provided frameworks, such as communities of practice, cultural-historical activity, or organizational socialization theory.

Topics that have emerged from this research are the importance of structure, effective feedback, participation, and relationships. Doctors, especially junior ones who have just made the transition to practice, find it hard to engage in self-directed learning. Specialists as well as residents need structure and guidance to help them learn from practice (Bravata et al. 2003; Teunissen and Dornan 2008). Feedback makes a particularly important contribution but it can be hard to get in practice. Feedback is performance related information that a person can use to identify areas in which their performance needs to improve. It can be explicit, obtained by observing the behaviours of others, or provided by measuring educationally relevant patient outcomes (Teunissen et al. 2009). According to Archer, "the health care professions have so far embraced feedback on their own terms. It is constrained by the classic medical hierarchical model, in which an expert supports a novice" (Archer 2010). There is room for medicine to find more effective ways of providing feedback.

Participation and relationships are two sides of the same coin. Practice-based learning requires participation in practice, which is a complex constellation of

professionals, rules, traditions, and histories. Whilst trainees and specialists engage with the different actors in workplaces in different ways, the requirements for effective learning are the same: legitimacy, feeling safe to contribute to common goals, and feeling safe to learn, which means being able to acknowledge failings. The relationships learners have with their supervisors and co-workers seem to have very important effects on feeling supported in their learning processes, in credibility judgments of other people's input, and in maintaining a safe healthcare system in general (Teunissen et al. 2007a, b; Watling et al. 2012).

Analysis of residents' narratives of their workplace learning by Shah and colleagues (2014) showed that the communicative practices of workgroups played a central role in learning. Verbal communication was with patients and their families, co-workers, expert advisers, and learners being taught by a resident. Informal discussion during practice – on ward rounds, or while co-reviewing a patient, for example – dominated but the many other discursive forms included questioning and being questioned, presenting cases for peer discussion, supervising and being supervised, receiving feedback and giving it, and teaching and being taught. Not all discourse was spoken. Some learning took place by modelling on behaviours demonstrated in embodied ways, as Bezemer et al. (2012) have also described, using social semiotics to analyse surgeons' learning. Contributing to and accessing written records, laboratory results, images, and resources of expert information were also important.

21.4.1.3 How Do Those Processes Affect Learning Trajectories?

Learning is guided by everyday activities that are dictated by the needs of healthcare and therefore difficult to regulate. Medical practitioners fear that participation in activities alone is not enough (Teunissen et al. 2007a). Their concern relates to what Billett describes as the “situational specificity of what is learnt, as well as the potentially too pragmatic focus” (Billett 2004b). Learning is opportunistic, determined by patients' presenting conditions. This adds to the value doctors attach to teaching theoretical knowledge. The opportunistic nature of learning leads to great diversity in the learning trajectories of different learners in the same phase of their medical careers. From the standpoint that expertise is always situated, contextual, and therefore unique, that is not problematic. However, doctors tend to move on from the place where they did their residency to a different workplace when they enter practice so drawbacks of the affordances of postgraduate training workplaces determining learning trajectories may come to light. Many do not feel competent in non-clinical tasks which have not been explicitly taught such as supervision, teaching, managerial, and financial skills (Stanley et al. 2005).

The learning trajectories of specialists, who develop their expertise within one or a limited range of contexts over many years, are even more diverse. Continuous professional development (CPD) is supposed to make sure they stay fit for practice. Traditionally, it has been organised as an educational activity; specifically, an 'update' model, according to which medical specialists get to learn about the latest

developments in their field of expertise, is still very alive today. That typically means “a large room full of physicians who have taken time off from their busy practices to listen to a series of speakers who lecture them about the most recent advances in their respective fields. The information presented may or may not be relevant to practice circumstances of members of the audience. And, even if it is, it may not be in a form that can be readily applied in practice” (Moore et al. 1994, pp. 4–31). That, however, is changing. In this domain as well, realisation has dawned that individual professional development goes hand in hand with the social and physical contexts that shape practice. As Cervero has said: “we need to find ways to better integrate continuing education, both in its content and educational design, into physicians’ ongoing individual and collective practice” (Cervero 2003).

There is a stark contrast between the dominant contemporary discourse of outcome based education, described above, and the learning trajectories described by respondents in studies of residents’ workplace learning (Teunissen et al. 2007b). Of course, residents celebrate achievements like successfully performing procedures and acquiring new knowledge, but they view their learning much more in terms of acquiring experience and becoming better able to engage in practice than in terms of reaching outcomes. Certainly, the type of outcomes that are supposed to guide learning in competency-based curricula do not seem to have the prominence that advocates of that approach might have expected (See, for example, Morcke et al. 2013).

21.4.2 Protoprofessionals Learning at the Boundary of Practice

This second example of medical workplace learning concerns the first major transition, when medical students get first-hand experience at the periphery of practice and learn to talk and act like doctors for the first time. The paragraphs that follow describe research that has contributed to the development of an “experience-based learning (ExBL)” model of medical students’ workplace learning.

21.4.2.1 What Conditions Influence Learning?

Using a design-based research methodology, Dornan et al. (2005) explored the extent to which medical students were able to behave self-directedly in clinical settings. They found learners were rarely fully autonomous or subservient. Learners depended upon support from their learning environments, which Dornan et al. (2005) categorised into three types: organisational; pedagogic; and affective support. In a later systematic literature review, they confirmed the value of those three categories and added a further categorisation (Dornan et al. 2014). Workplace learning was supported at curriculum level, placement level, and interactional level. Curriculum level support took the form of planning and resourcing experience as

part of the overall process of curriculum design. Placement level support took the form of organising the delivery of relevant experience. Support at the interactional level was both formal – helping students rehearse the duties of a doctor, for example – and informal, which meant doctors being approachable and willing to converse with students. Whilst it is generally taken for granted that being given a placement in a workplace ensures that a learner will have ready access to educationally valuable activities, that was not always the case. The subsequent research of Steven et al. (2014) discussed in the next section, elaborates that point. In parallel with those qualitative studies, a series of publications reported the development of a measure of the educational quality of clinical workplaces. The Manchester Clinical Placement Index has a theoretical orientation towards COP theory (Dornan et al. 2012). Its 11 items allow learners to rate organisational, pedagogic, and affective features of their learning environments, which contribute to a single summary quality measure. Evidence has accrued to support the validity of the scale across different types of clinical workplace.

21.4.2.2 What Learning Mechanisms Operate?

Consonant with the “participation metaphor of learning” (Sfard 1998), ExBL research has defined “supported participation” as the core condition for medical students’ workplace learning (Dornan et al. 2007). There are three levels of participation: Observing; rehearsing tasks performed by doctors; and contributing to patients’ care by performing those tasks “for real” (Dornan et al. 2014). Students learn best by participating at the highest level their current expertise and the complexity of a situation permit (Dornan et al. 2007). Whereas interactions between doctors and patients are conceived of as a dyadic relationship, medical students workplace learning takes place within triadic relationships (McLachlan et al. 2012). Exit interviews of patients and medical students after outpatient teaching encounters by Ashley and colleagues (2009) suggested that doctors moderated the interaction between students and patients within that triad for better or worse.

A wish to explore the place of patients within clinical communities of practice, and the effect of teaching encounters on patients’ identities, led to a further study (McLachlan et al. 2012). This confirmed the pivotal role of doctors in moderating students’ learning from patients, but made the surprising observations that patients more often than not represented “objects” for students’ learning, rather than subjects whose personhood was at the centre of students’ learning. More surprising still, patients not just accepted being objectified, but experienced that as a natural place for them to take in students’ learning. When, as in one particularly salient case observed in this research, patients wished to have more active roles, very sophisticated handling of consultation dynamics was required of doctors. From a communities of practice perspective, doctors’ role was to manage the boundaries of two concurrent practices – a practice of patient care and a practice of medical student education – to draw most effectively on the resources of the other two members of the triad, and to the greatest benefit of all parties. Given the scale of

the task, it is unsurprising that it not infrequently failed such that students did not gain educational benefit from patient care, or patients did not gain clinical benefit from medical student education. Steven et al. (2014) applied the concept that scholarly practitioners manage the boundaries of practice to achieve the greatest benefit of learners and patients to medical students' narratives. They found students' informal practice-based learning to be located within the discursive practices of clinical communities. They showed how the various stakeholders encountered by medical students in workplaces discursively positioned the boundaries of practice to support access, legitimacy, and the various levels of participation previously described. In another study, Singh et al. (2014) showed how more junior doctors were inclined to position the boundaries of practice to foster students' inclusion, whereas "old-timers" were more prone to exclude learners from the discourse of practice-based learning.

21.4.2.3 How Do Those Processes Affect Learning Trajectories?

Qualitative evaluation of medical students' workplace learning highlighted how much of their learning was affective (Dornan et al. 2007). By examining students' reports of what they had learned from contact with real patients, Bell et al. (2009) confirmed and extended that observation. They found that exposure to patients was an end in itself, not just an intermediate step in the attainment of measurable learning outcomes (Morcke et al. 2013). Put simply, experience of reality taught students about reality and they valued it. Given that reality is what they have to practice in the future, that did not seem an unimportant outcome. It is important to note, also, that students learned using touch and visual pattern recognition as well as through dialogue and physical examination. Affective outcomes included enhanced confidence, motivation, satisfaction, and a sense of belonging. Cognitive outcomes included perspective, context, a temporal dimensional and an appreciation of complexity. Real patient learning helped respondents link theory with their referable, visual, and auditory experiences. It also made acquisition of the theory and skills easier.

To summarise the impact of real patient exposure on medical students' learning trajectories, it was of intrinsic value and its downstream consequences were the acquisition of proficiency and the development of affects, which together constitute the emerging identity of a doctor.

21.5 Conclusions

Medicine is a profession, which applies a single underpinning ethical code to a wide diversity of practices. The ethical code has four main principles: autonomy, beneficence, non-maleficence, and justice. Doctors should work for the benefit of patients, not harm them, help them to be the people they want to be, and do so justly. The code

does not call for doctors to self-sacrifice but it demands that any benefit to them should result from benefit to patients. Education is embedded within the ethic of medicine. Doctors should promote the autonomy of trainees as well as patients. Every doctor learns to care for patients by practising alongside trained doctors. In due course, they must be prepared to practice education simultaneously with patient care. Sometimes that fails. Sometimes it is an uneasy compromise. But when it works well, it provides the most important underpinnings of trainees' future practice. So, practice-based learning is not something we can choose to include or exclude from medical practice. It is an expectation of every trainee and every trained doctor.

The diversity of medical practice ranges from specialties where doctors are connected with patients solely by performing technical services for or on them, to specialties where doctors are connected with patients solely through the medium of talk. Either way, the same ethical code applies. Importantly, medicine is not now seen as a solitary practice. Even – perhaps especially – doctors in technical specialties who have no direct social contact with patients work in teams. It is recognised that their technical skills are less valuable if they lack the non-technical skills that enable them to work with other people, whose status, level of education, and disciplinary background may differ from their own. So, medicine is an essentially social practice. Medical education is even more explicitly a social practice, nesting within medical practice physically, intellectually, practically, and ethically. That broadly answers the question posed at the start of the chapter: “What attributes of medicine shape its contribution to the wider scholarship of practice-based learning?”

Earlier sections described two dominant theoretical perspectives in medical education research: Psychology, particularly cognitive psychology, and social learning theory, particularly sociocultural theory. Social learning theories, sociocultural more than social cognitive theory, have become popular because of their ability to explain the social aspects of medical practice and education highlighted in earlier paragraphs. The medical education research community is increasingly conceptualising medical education as a process of identity development. Both conceptual orientations are able to explain how that occurs in social milieus and how identity development is interdependent with the emotional as well as practical nature of practice-based learning.

The question remains when and how practice-based educational approaches should best be used. The tendency in medical education is to introduce them early, in parallel with science education, so that each can inform the other. Instructional designs using simulation are in the ascendant but, even then, a key question is how skills learned in simulation can assuredly transfer into practice-based learning. Two tensions, which have important effects on practice-based learning, run through the discipline of medical education. The first is a tension between medicine as applied science versus medicine as scientifically informed practice. Most medical schools regard the “science” that is applied in medical practice as biomedical science. The notion of scientifically-informed practice, however, opens the way for behavioural and social sciences to take their place alongside biomedical sciences. The second tension is between medical practice as essentially standard, with exceptions, or

essentially non-standard, with some commonalities. Historically, doctors took the second position but their leaders, who are advocating “competency-based education”, are pulling them towards the first position. Doctors’ individualistic behaviour, it must be admitted has led to some spectacular professional failures. The move towards standardisation has been strengthened by those failures and the move to standardise medical competence is part of a politically-led, regulatory discourse of medical education. It cannot be predicted how that tension will be resolved over time, but efforts to ensure patient safety by standardising practice come at an inevitable cost. Some patients’ individual problems are best served by crafting individual solutions, and breaking rules rather than adhering to them.

We have shown how theoretical models of practice-based learning can be developed by closely observing and theorising about clinical and educational practice. The benefit of that approach is that it makes the wisdom of practice more widely available by finding its generalities, defining, and disseminating them. Used carelessly, that approach could institutionalise ineffective practice. We do not think that is likely because careful observational research, using qualitative methodologies, makes it possible to identify outcomes that are valued by learners and trace their origins within educational practice. The longer term benefits and harms of codifying medical practice-based learning are hard to predict. We conclude, nevertheless, that medicine’s contribution to the wider scholarship of practice-based learning is to show how the expertise of seasoned professionals can be made accessible to novices in a scholarly way under the prevalent conditions and pressures for reform of twenty-first-century society.

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Chapter 22

A Phenomenographic Way of Seeing and Developing Professional Learning

Ming Fai Pang

Abstract The growing interest in professional education has brought questions about how and where professional learning can best be developed. This chapter proposes a basis for developing professional learning, which adopts the view of learning from phenomenography. It is argued that professional learning can be conceptualized as a qualitative change of the learner in his or her way of experiencing or seeing the phenomenon or situation, which can be defined in terms of the critical aspects of the phenomenon or situation which the learner simultaneously focuses upon and discerns. It is also argued that by providing the learner with the opportunity to experience certain patterns of variation and invariance in the learning condition, he or she will be empowered to discern and focus on the critical aspects, which in turn improve his or her professional capabilities to handle novel situations.

This chapter first discusses how three major theories of learning, i.e. cognitivism, constructivism and situated cognition, conceptualize professional learning. It is followed by an explication of the phenomenographic way of seeing professional learning, with the highlight of the underpinning theory of learning, the variation theory. To exemplify how we attempt to foster professional learning among the learners, an empirical study which helps student teachers to develop professionally by forming a more sophisticated way of experiencing good teaching is reported. The chapter concludes by discussing implications of this view of learning for instructional practice within professional education.

Keywords Phenomenography • Variation theory • Learning study • Professional learning • Student teachers

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22.1 How Other Theories of Learning Conceptualize Professional Learning

Professional learning is regarded as a very complex, multi-faceted phenomenon. No researchers has yet been able to develop a single comprehensive theory of learning which can cover all aspects of professional learning and provide a complete explanation for how or why professional learning occurs. Often, different theories of learning have been developed to account for the different aspects of professional learning and each of the theories tried to tackle some central and fundamental questions about professional learning.

For instance, cognitive theorists conceived of professional learning as an individual's acquisition of information from a decontextualized body of knowledge, in which the learner forms a representation of the outside world in their heads, and certain mental operations are performed on this representation; thinking is thus a manipulation of the representation. This paradigm has a dualistic ontological stance, in that cognitive theorists view the world and the mind as separate entities. They believe that the learner develops the mental representation through drawing together sensory elements which are then placed in some kind of schema, with the result that the objective world "out there" is represented by various memory structures inside the mind. New experiences are interpreted in relation to existing schemas, and when there is a discrepancy between the new experience and existing schemas, the mind assimilates the input data with existing representations in order to resolve the conflict; and in this way, the schemas might be modified (Cooper 1993).

Professional learning is thus seen as a change in the learner's mind—in the mental representation of the external world and the mind becomes an information processing system whereby learners process information procedurally, starting from inputting sensory information into perceptual memory, then into working and long term memory, and lastly into response generation. Cognitivist theorists try to understand what people do in terms of what goes on in their heads, in other words, in terms of the internal representation as well as the procedures operating on the representation.

Where cognitivist theorists emphasized professional learning as an internal process, constructivists believed that professional knowledge does not come to us passively from the outside world, 'ready-made', nor innately, but is actively constructed within our minds. The constructivist paradigm also affords a dualistic ontological stance, in the sense that the learner and the world are regarded as separate entities. People do get information from the world, but this information is only sensory—in itself it does not carry meaning; it is the mind which combines these sensory impressions in order to construct meaning. Moreover, although people live in the same world, they construct meaning differently. This difference is not a function of what is out there, but rather of what is inside our heads. According to constructivist thinking, it is because we ourselves construct different images of the world in which we live.

At the heart of the constructivist view of learning (Ernest 1995; Phillips 1995; Steffe and Gale 1995; Tobin 1993; Treagust et al. 1996) is the belief that knowledge about

the external world is a human construct, and that learners actively construct their knowledge on the basis of knowledge already held. Romberg and Carpenter (1986) claimed that “the research shows that learning proceeds through construction, not absorption” (p. 868), or, in other words, that knowledge is not passively received but actively built up by the learner. Professional learning is thus seen as the building of mental structures. The “building blocks” of understanding are the results of previous acts of construction, in the sense that a previously built structure forms the basis for the ensuing constructions. Seen from this perspective, professional learning proceeds with construction, in the sense that learners actively construct their knowledge on the basis of knowledge already held.

Situated learning theorists, however, viewed professional learning as a social act, taking place in a social context. This school of thought used the metaphor: learning as participating in communities of authentic practice, and learning as “... an aspect of participation in socially situated practices” (Lave 1996, p. 150). In the process of “legitimate peripheral participation” (Lave and Wenger 1991), when the novice moves from the periphery of the community of practice to its centre, he or she becomes more active and engaged with the culture and thus assumes the role of expert. As Brown and Duguid (1996) put it, the newcomers “steal” the knowledge that they need by legitimately and peripherally participating in authentic social practice. Professional learning in this view is conceived of as belonging to and participating in that which embodies certain beliefs and practices. According to Lave and Wenger (1991), “A person’s intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a sociocultural practice” (p. 83).

This notion of enculturation is central to the paradigm of situated cognition, in that professional learning is viewed as a cultural activity. Brown, Collins and Duguid (1989) argued that “... knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used” (p. 32). Lave (1988) contended that cognition is situated in the practical doings of “just plain folks” and knowledge is distributed not only amongst people but also across cultural artefacts. For instance, tailors’ apprentices learn not only how to make clothes but also certain ways of speaking and behaving as a tailor, in order to become a legitimate participant of a social group. This is in line with the Greeno et al. (1998) argument that learning is identity shaping. Individuals participate in different communities of practices and achieve their identity in each community through their personal trajectories of participation, i.e. changing participation of the learner in the community of practice (Wenger 1998). The prominent feature of situated cognition can be depicted as “shifting the focus from individual *in* environment to individual *and* environment...” (Bredo 1994, p. 29, italics as original).

Within this paradigm, the focus is on sociocultural forms of learning, and the unit of analysis is not the single individual but the social setting. Researchers such as Jean Lave (1988, 1991) and Lucy Suchman (1987, 1993) discussed the cultural construction of meaning and argued that learning should be studied as a social, collective phenomenon (Lave 1996). According to Lave and Wenger (1991), “Learning is a process that takes place in a participation framework, not in an individual mind.

This means, among other things, that it is mediated by the differences in perspectives among the co-participants. It is the community, or at least those participating in the learning context, who “learn” under this definition. Learning is, as it were, distributed among co-participants, not a one-person act” (pp. 15–16).

The most distinctive feature amongst these three theories of learning is that the first two theories of learning are grounded in a dualistic ontological position, in the sense that the world and the learners are treated as separate entities. A slight distinction between them is that the constructivist would argue that one can never reach the world out there because what one sees is one’s own construction, that is an image that one creates, so the two are completely separated. Knowledge is constructed in one’s mind. The cognitivist, however, would claim that we receive information from the objective external world through our sensory channels and then form mental representations of this information. Therefore, an objective reality does exist independent of the learner, and knowledge is found in the objective world. In contrast, situated cognition is opposed to the idea of understanding what goes on in people’s heads or their mental representations of the outside world. They see professional learning in terms of interactions with the world, which depends on the “whole connection”. Knowledge is socially negotiated and embedded in a particular context, in the sense that knowledge cannot be separated from the practices and occasions of which it is the outcome. To sum up, despite the substantive differences between cognitivism, constructivism and situated cognition, each theory of learning does deal with some very crucial questions about professional learning, which contributes to a better understanding of this pertinent phenomenon.

22.2 The Phenomenographic Way of Seeing Professional Learning

In contrast, phenomenography focuses on the understanding of people’s experiences of the world, which is distinguished from cognitivism and constructivism, for example, by its non-dualistic ontological stance. According to Marton and Booth (1997), “experiences do comprise an *internal relationship* between the subject and the world, and that is the fundamental characteristic: An experience is of its essence *nondualistic*” (p. 122, italics as original). According to Marton (1981), human experiences cannot be accounted for either by the elements of the situations or by the general cognitive functioning of the individual, as humans and the world are regarded as inseparable entities.

In phenomenography, professional learning is seen as a qualitative change in one’s way of experiencing or seeing. It is thus a process in which the learner reconstitutes the world which he or she has already constituted. It is different from cognitivism which regards professional learning as a change in one’s mental representations of the world out there; it is different from constructivism which conceives of professional learning as constructing an understanding of the world on the basis of knowledge which the learner already holds; it is also different from

situated cognition, which sees the social settings and cultural environments outside the individual as the fabric of knowledge. According to Marton and Booth (1997), learning takes place by a change in something in the world as experienced by a person. The new way of experiencing or seeing something is constituted in the relationship between the experiencer and the experienced, and the descriptions of people's experience is content-oriented and seen as concrete cases of human functioning (Marton 1981). Erickson (2000) suggested that phenomenography holds a more holistic position than other paradigms and thus the conceptual and empirical work which build on it should warrant careful attention on the part of the science education community.

Professional learning is conceptualized as a matter of seeing, or experiencing, something in a new way. The analogy is with the actual visual act of seeing a phenomenon in the real world, where one focuses on certain features of the object of one's vision at one particular time, and on other features at another time. In the same way, professional learning entails discerning, or experiencing certain aspects of the phenomenon or situation in one's awareness. According to Marton and Booth (1997), learning is a change in one's structure of awareness, i.e. those aspects of a phenomenon which are "figured" or highlighted simultaneously in a person's awareness at a particular time, or an increase in one's ability to see or experience something in a certain way. In other words, people can build up their competence in seeing, that is, understanding the world to deal with novel situations in the future (Bowden and Marton 1998).

Bowden and Marton (1998) posited that discernment "is a defining feature of learning in the sense of learning to experience something in a certain way" (p. 35). Professional learning is thus associated with a change in discernment, which entails a change in the aspect(s) of the phenomenon in the focal awareness of the learner: in other words, a change in the way of seeing the phenomenon. All the time people cast our focal awareness simultaneously upon certain aspects of a particular phenomenon, which are discerned in our structure of awareness. It is worth noting that being focally aware of these aspects does not mean that we are totally unaware of other aspects of the phenomenon in question. Rather, it means that these aspects become figural or foregrounded in a person's awareness, whilst other aspects remain in the background. This resembles the act of seeing when we may direct our attention to certain features of the object or person without paying much attention to other features.

In the same way, when we see something as something we cast our focal point over certain defining features of the object so that we can recognize it as such. We may not notice other features of the object, although they are still there, as they are at the periphery of our focus. For instance, when I am very thirsty and want to find a cup, I will try to look at the various objects in my sight with the defining features of a cup, but other features such as colour or shape may not be in my focal point at that moment.

Furthermore, even when we see the same object or phenomenon, the meaning may be different to the same person at different times. For instance, when the relationship between two good friends turns sour, each may focus on aspects of the

other that had previously carried different meanings. In the past, a smiling face may have been very sweet and sincere, but now the same smile becomes the masquerade of a cunning man. Wording that was once considered a joke now becomes a kind of harassment as one casts their focal attention upon different aspects of the same thing at a different time.

A way of seeing or experiencing something is thus conceived of as “the set of different aspects of the phenomenon as experienced that are simultaneously present in focal awareness” (Marton and Booth 1997, p. 101), and professional learning is seen as a qualitative change in one’s way of seeing or experiencing. This amounts to being able to discern certain aspects of the phenomenon that one could not previously discern or took for granted, and to keep them in focal awareness.

22.2.1 *Variation Theory of Learning*

In phenomenography, in order to develop professional learning, the question to be asked is “How is it possible to bring forth a change of the aspect(s) of the phenomenon or situation in the learner’s focal awareness and subsequently a change in their way of seeing or experiencing?”, or fundamentally, “What does it take for a learner to discern a particular aspect of the phenomenon or situation?”. According to the variation theory from phenomenography (e.g. Marton and Booth 1997; Marton and Pang 2006, 2013; Marton and Tsui 2004; Pang and Marton 2013), variation is the key for effective discernment, and the chief mechanism of learning.

According to Marton (1999), variation is the *sine qua non* of learning. In order to discern, one must experience variation. When a certain aspect of a phenomenon varies while other aspects remain invariant, the aspect which varies is discerned (Marton and Booth 1997). Discerning an aspect therefore implies that one has experienced a variation or difference between two entities or between two parts of the same entity. According to Marton and Pang (2006), “one cannot discern quality X without simultaneously experiencing a mutually exclusive quality ~X”. To put it another way, to discern an aspect, the learner need to experience its potential alternatives against the background of invariance in other aspects of the phenomenon.

For instance, suppose we were living in an entirely dark world, then we would be unable to notice and discern the darkness without ever experiencing light. Awareness of hotness presupposes awareness of coldness (or at least not hot), and awareness of a particular flavor, say sweet presupposes awareness of other flavors (or at least one other flavor). One cannot possibly understand what English is simply by listening to different people speak English if one has never come across another language, and one cannot possibly understand what loyalty is by inspecting different examples of the same degree of loyalty. A way of seeing or experiencing something does not originate from the experience of sameness, but rather from the experience of difference (cf Marton 2006).

According to the present line of reasoning, the learner is able to discern an aspect or part (or several aspects or parts) or derive a novel meaning of something by

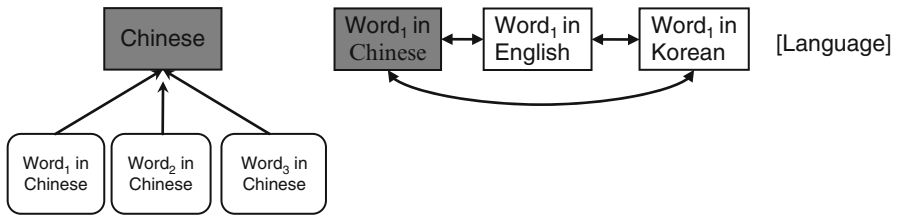


Fig. 22.1 Contrast and discernment

contrast. What is focused upon is a component part of variation (e.g., “flavour,” “English,” “loyalty”), whereas the other features of the same entity (e.g., smallness or largeness, sharpness or dimness, formal expression or casual chat) are kept invariant. As an example, let us consider two different patterns of variation and invariance used to help someone to discern the meaning of “Chinese”, as shown in Fig. 22.1.

Learning to make a novel meaning one’s own amounts to discerning an aspect or part (or several aspects or parts) of something, through variation (difference) in the focal aspect (that to be discovered) and invariance in other aspects. We call this the variation theory (of learning).

For a particular feature to be discerned, it must be separated from that which it is a feature of. If everything is purple, then the color purple cannot be separated out. Hence, it cannot be discerned. To be able to separate out and discern “purpleness”, you must see something that is purple (a box, for instance) and the same thing (a box) in another color (say yellow). As seen from Fig. 22.1 (on the left), if you hear only one language, say Chinese, all of the time, then you cannot possibly separate “Chinese” from “Language,” or “Language” from “Chinese” for that matter. The two are glued together and become inseparable. To be able to “think apart” or “tell apart” the two and come up with two distinctive concepts (“Language” and “Chinese”) rather than one, you must encounter another language. As shown in Fig. 22.1 (on the right), by experiencing the difference between two languages—Chinese and English, for instance—you not only appropriate a rudimentary version of the concepts of “Language” and “Chinese” but, in this case, even the concept of “Korean.”

We thus acquire the meaning of something or discern an aspect of something by learning what it is not. Therefore, by listening to a language other than Chinese and noticing the difference between the two, we become able to separate “Chinese language” from “Language.” If, however, the Chinese that we have heard in our entire life is a particular dialect of Chinese, then Chinese and this dialect are for us identical, and we have a rather narrow understanding of what Chinese is. Through contrast, we have separated “Chinese” from “Language,” and learned that there are different languages of which Chinese is one. Now, we have to separate “Chinese” from our own particular dialect, and learn that there are different dialects of Chinese of which that is spoken in my hometown is just one. We can do so by encountering another dialect—or several other dialects—of Chinese. The pattern of variation and invariance is illustrated in Fig. 22.2. Now, “Chinese,” which was a focused feature (value) previously, becomes a focused aspect (dimension of variation) that is

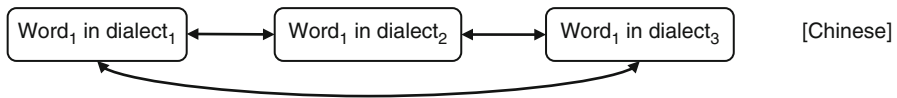
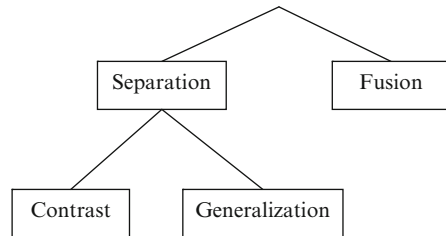


Fig. 22.2 Chinese language and its dialects

Fig. 22.3 Patterns of variation and invariance



generalized across different dialects, all of which are Chinese. Here, it is not the meaning of “dialect” that is highlighted; rather, we are enriching the meaning of “Chinese” by separating it from any specific dialect and allowing for variation in dialects.

We call this pattern *generalization*, and the focused aspect (Chinese) is invariant. We are not attempting to locate the meaning of the focused feature. “Dialect” is an optional attribute of “Chinese”; regardless of the dialect, the language is Chinese.

According to this line of reasoning, learning amounts to the increased differentiation of experienced entities through the discernment and separation of features from other features and from that which they are features of. This view of learning is akin to going from an undivided whole to a differentiated and integrated whole, which resembles Werner’s (1957) orthogenetic law and Gibson and Gibson’s (1991) way of describing (perceptual) learning. The latter authors distinguish between two ways of seeing learning: as enrichment or as differentiation. The former way implies that what is perceived is interpreted using memory resources, and thus develops into a full-blown novel meaning: the learner must add to his or her originally meager perception. Our way of seeing something is always richer than that which we see. The latter way of seeing learning implies that the originally vague impression is differentiated—“the world gets more and more properties as the objects in it get more distinctive ...” (p. 34). What we see is always richer than our way of seeing it.

This second alternative means that in the course of learning, we learn to distinguish one thing from another, one feature from another, and one feature from one thing. Doing so involves experiencing both sameness and difference, which involves the simultaneous experience of those entities that are the same and those that are different. Once we have learned to tell them apart (through separation), we learn how to put them together (through fusion), that is, how to see them at the same time (simultaneously). The different patterns of variation and invariance through which this process takes place are shown in Fig. 22.3.

What does it take to discern a particular aspect or feature of a phenomenon or to separate one particular aspect from other aspects and from what it itself is a

feature of? A necessary condition for the former is that the learner experiences variation (or differences) in relevant aspects against a background of invariance in other aspects. Accordingly, learning is more likely to occur when there is variation to be experienced.

22.3 The Empirical Study

In phenomenography, we believe that how a person acts and performs in a professional context hinges largely upon how he or she sees the phenomenon or situation. Professional learning is thus characterized as a qualitative change in one's way of experiencing or seeing the professional phenomenon or situation encountered (e.g. Pang 2006). To illustrate how we attempt to bring about professional learning, an empirical study is reported here in which a group of student teachers were supported to develop professional learning through a "Learning study" (e.g. Pang 2010; Pang and Lo 2012; Pang and Marton 2005) premised on the variation theory. The primary aim of conducting the Learning study in the initial teacher education programme is to enable student teachers to learn professionally by developing a more considered and sophisticated way of seeing or experiencing teaching. It is done through experiencing variation in the critical aspects of good teaching in the subject area concerned. More specifically, student teachers will be given the opportunity to engage in the evaluation of the quality of the lessons taught by all the student teachers, in which the topic or concept to be dealt with by the teachers is kept invariant whereas other critical aspects of good teaching are varied in the course of reflection and deliberation, which are either introduced by the student teachers themselves or by the teacher trainer. With the use of this pattern of variation and invariance, student teachers will be able to discern and focus on the critical aspects of good teaching and demonstrate a progression in their way of experiencing or seeing good teaching. In the following section, the 'learning study' approach is firstly introduced, which is to be followed by an explication of the design and procedures of the empirical study as well as the findings.

22.3.1 The Learning Study

The Learning study approach is premised on design experiments (e.g., Cobb et al. 2003; Kelly 2004) and at the same time borrows the insights of both the 'lesson study' model from Japan (e.g., Lewis et al. 2006; Stigler and Hiebert 1999; Yoshida 1999) and the 'teaching research group' model from China (e.g. Ma 1999), in which teachers collaboratively plan, implement and evaluate lessons without explicit theoretical grounding.

In a Learning study, a group of (student) teachers works together to find ways of making it possible for pupils to appropriate a certain object of learning, i.e. what

pupils are expected to learn in the lesson(s). According to Pang and Marton (2003), an object of learning is a specific capability that the pupils are expected to develop during the lesson(s). The teachers first choose a specific object of learning which is ideally central to the curriculum and which causes consistent learning difficulties for their own pupils. Once the object of learning is decided, the group as a team does the planning of the lesson(s) together, drawing upon their own past experiences in handling this specific object of learning, relevant research and resources (which can be pure academic research, teachers' action research, case sharing or teaching and learning resources), the learning theory which they consider to be insightful (in this case the variation theory is used), and most important of all, the exploration of pupils' prior understandings and initial mastery of the object of learning through the conduct of pre-test and/or interview.

Based on the findings of the pre-test and/or interview together with the teachers' own disciplinary and pedagogical knowledge, the teachers attempt to find out the critical aspects of the chosen object of learning, which are considered to be critical to the pupils' appropriation of the object of learning. Thereafter the teachers draw upon the variation theory and use it as the guiding principle to design the instruction. The finalized design is usually expressed in the form of lesson plan(s) and learning resources.

One of the group members will then enact the lesson plan in his or her classroom while the other members observe. Usually, the lesson is video-recorded, and what the pupils have learned is probed by post-tests, which can be in the form of written tasks and/or interviews after the lesson(s). With the use of the variation theory as the analytic framework, the teachers analyze the lesson(s) in terms of whether it was possible for the pupils to appropriate the object of learning through the pattern of variation and invariance co-constituted by the teacher and the pupils. To evaluate the lesson(s), the teachers compare the post-lesson learning outcome with the pre-lesson one at an evaluation meeting. The gains and the absence of learning gains can be associated with what has been enacted in the classroom. The group may then come up with some suggestions for pedagogical improvement. Subsequently, another teacher in the group carries out the revised version of the lesson plan following the same procedure. The cycle is repeated until all group members have carried out the lesson(s) with all the participating classes, and the study is always concluded by documentation and dissemination to other teachers.

22.3.2 Design and Procedures of the Empirical Study

Ten pre-service student teachers and seven in-service student teachers who enrolled in the Postgraduate Diploma in Education programme majoring in economics education were invited to participate in the study. Before the introduction of the Learning study, all the student teachers were interviewed to obtain pre-entry data of their ways of experiencing of good teaching in economics. Furthermore, to prepare them for participating in the study, all student teachers attended three sessions of 4 h each which served to help student teachers learn about the rationale behind and the

ways to conduct a Learning study, with the use of examples of other Learning study done in the area of economics. They were then divided into five different Learning study groups and started their data collection to investigate the variation in pupils' understanding of *the same* economic concept or topic through observations, interviews and/or pre-tests. After getting the pupils' pre-lesson understandings, they held regular meetings with their group members during Self-Directed Learning sessions as well as outside the timetabled sessions to discuss about the teaching strategies and learning resources to respond to the variation in pupils' understandings and to help pupils master the object of learning, using the variation theory as the guiding principle for instructional design. An on-line platform was created, in which all student teachers were invited to put up their lesson plans and materials, and comment on the work of each other. Later on, each student teacher implemented the shared lesson plan of his or her Learning study group in his or her classroom during teaching practicum (for pre-service student teachers) or during normal teaching days in schools (for in-service student teachers). All the lessons were video-recorded for discussion and professional reflection in a debriefing session afterwards. By the end of the teacher education programme, student teachers were asked to document their learning experience in carrying out the Learning study in the form of a report.

To explicate, in order to enable student teachers to learn professionally by developing a more considered and sophisticated way of experiencing good teaching in economics, a debriefing session were held in which student teachers were invited to evaluate and comment on the video-recorded lessons of all the student teachers (including himself or herself). Each student teacher was asked to decide and justify whether the teaching of the lesson to be observed is in good quality. There is more or less a consensus among researchers and teacher trainers that classroom video is a valuable tool for fostering reflection of student teachers (e.g. Blomberg et al. 2014). This arrangement allowed the student teachers the opportunity to take different perspectives on their professional activity, which seemed to be useful. They were able to develop a feeling of "ownership" from these processes and were more intrinsically motivated to engage in professional reflection and learning.

Based on Pang's (2006) study, critical aspects of the ways of experiencing good teaching in economics such as student learning outcomes, teaching approaches and strategies, objectives of economics education and so on were identified. The teacher educator consciously created a pattern of variation and invariance in the debriefing session, through which students' focal attention was drawn to these critical aspects. In accordance with the variation theory, the teacher deliberately kept the economic concept or topic to be dealt with by the teacher in the lesson invariant, but opened up different alternatives and values in the dimensions of variation corresponding to these critical aspects.

To exemplify, in the course of deliberating and evaluating the lessons, the teacher educator posed reflective questions to student teachers about the various possibilities and alternatives in the critical aspect in question (i.e. student learning outcome), e.g. whether good teaching should help improve student learning outcome, and if so, what kind of student learning outcomes should be valued: grades in public examinations, understanding of the economic concepts or the capability of using the

economic concepts learned to deal with some issues related to pupils' daily life? Are these learning outcomes mutually exclusive with each other? By keeping the topic to be handled in the video-recorded lesson to be invariant, the focal awareness of the student teachers was directed to the critical aspects of good economics teaching, with the use of reflective questions and class discussions which brought up corresponding variation in the critical aspects. The variations could either be created by the student teachers themselves or brought up deliberately by the teacher educator. By experiencing variation in the corresponding critical aspects, student teachers were helped to discern the critical aspects of good teaching in economics and subsequently develop a more sophisticated way of experiencing.

Finally, in order to investigate whether this intervention has an impact on student teachers' professional learning in terms of their ways of experiencing good teaching, all student teachers were interviewed again after they had completed the Learning study. The outcomes were compared to the interview conducted with the students before the introduction of the Learning study.

22.3.3 Data Collection and Analysis

All the student teachers were interviewed twice to find out their ways of experiencing good teaching in economics. Semi-structured interview was conducted with each student teacher individually. The principal question was "What do you mean by good teaching in economics?". The other questions were derivations of it, such as "How do you characterize "good"?", "Do you think that good teaching in economics could possibly be different from other subject discipline and why?" and so on. For the purpose of clarification and for exploring more deeply the thoughts and ideas of the interviewee, spontaneous questions were asked from time to time. Each interview lasted for around 30–45 min and it was conducted in Cantonese.

The interview data collected were analyzed following the phenomenographic conventions (Akerlind 2005). The interview transcripts were first looked at holistically to get the global meaning, with some parts of the interview transcripts being labelled as significant quotes which were brought together to become a pool of meaning. Their similarities and differences were then highlighted and noted. The individual quotes were then labeled and put back to their original contexts to see if the labels matched the global meanings of the whole transcript of the individual interviewee, and at the same time they were compared and contrasted with the transcripts of other interviewees. This process went on and on until the critical differences between all the qualitatively different ways of experiencing the phenomenon were uncovered. Finally, a set of categories that displayed the variation in ways of experiencing good economics teaching were derived in accordance with logical inclusiveness and adequacy.

As our focus is on the professional learning of the student teachers in terms of their ways of experiencing good teaching in economics, if a student teacher expressed two different ways of experiencing in the course of the same interview, then the more complex and inclusive one was counted for that particular student teacher.

22.3.4 Results and Findings

The five qualitatively different ways of experiencing good economics teaching were identified from the data collected. They are presented and ordered here according to their increasing level of complexity.

Category A: Good economics teaching as managing to help pupils achieve good public examination results through the acquisition of examination techniques

As Hong Kong public examinations are high-stake, both teachers and pupils put top priority on how to obtain good grades in the examinations. Two of the in-service student teachers exhibited this way of experiencing before the conduct of the Learning study. They thought that good economics teaching means imparting examination techniques to pupils in an efficient manner through drilling past examination questions. In structural terms, they focused on the nominal outcome of teaching and learning economics—the grade in public examinations only, rather than on pupils' economics understanding and the way to achieve this is through mechanical mindless drillings.

I: So [...] what [features in a good economic teaching] do you think is the most important [...]?

S: If...for the most important, I think it must be the practice on past paper, since the practice on past paper is the most useful for [the preparation of] examination.

I: [...] Do you think the teaching of economics is for examination or...

S: If you are talking about secondary schools, inevitably it [the teaching of economics] is mainly for the [purpose of] examinations, unfortunately...

(In-service student teacher 01, entry interview)

Category B: Good economics teaching as managing to arouse pupil interest in learning economics through teachers' use of interesting examples and activities

Student teachers who expressed this way of experiencing thought that good economics teaching means arousing pupils' interest in learning economics. If the teacher is able to motivate his or her pupils to learn economics, he has made some good achievement. They focused on the teaching arrangements such as group work, games, jokes, etc, and the use of interesting examples which closely link to pupil life experience. This conception is more frequently found in student teachers who practice their teaching in schools which admit pupils of lower academic ability.

S: I think his teaching is quite good...Economics is a subject containing lots of information. Often, the class is dominated by teachers' lecturing and pupils are simply jotting notes. This teacher is quite good. He organizes group discussion for the pupils on some examples or cases which he had well chosen. The examples are relevant to the pupils' life experience, which can arouse their interest in learning this abstract topic. Some teachers may use examples which are beyond pupils' experience and maturity. But I like the examples used by this teacher.

(Pre-service Student Teacher 02 Exit Interview)

Category C: Good economics teaching as managing to help pupils understand economic concepts through teachers' well-chosen examples and clear presentation

Student teachers who exhibited this way of experiencing viewed good economics teaching as helping pupils develop good understanding of the economic concepts to be learned. They believed that the examples chosen by the teacher are very crucial for achieving this. If examples which relate to pupils' daily life experience and which can illustrate the critical attributes of the concepts, pupils would find it easier to grasp the economic concepts. Equally important is the clarity of teachers' presentation. If the teacher can present the concept in a clear and lucid manner, from simple to difficult, the pupils will be able to understand the concept and not get confused.

S: Good economics teaching...helps pupils develop clear conceptual understanding and does not make pupils feel confused. In other words, the teacher needs to present it very clearly. She needs to explain it systematically and tell how it distinguishes from another similar concept. Also, at the beginning the teacher should use some simple examples to help pupils grasp the concept before going to the difficult ones. ...Also, the examples should be related to real-life situation. Actually, the teacher in the video has done it. His examples are closely related to pupils' life experience. This would raise pupils' interest to learn economics.

(Pre-service Student Teacher 05, Exit Interview)

Category D: Good economics teaching as managing to help pupils apply the economic theories learned to real-life situation through teachers' use of well-chosen examples and cases

Student teachers who expressed this way of experiencing thought that good economics teaching needs to enable pupils to apply what they learned in economics to explain the real-life economic phenomena. They considered it as the most important goal of economics teaching. The way to achieve this is through teachers' use of real-life examples or authentic cases in their teaching. This would make the pupils realize that the economic concepts they learned can be applicable to the real world. The focus is on the applicability of the theory to reality.

S: I think good economics teaching should be that the teacher can clearly demonstrate to the pupils how the economic theory can be applied to real-life examples...The teacher should give more examples to demonstrate this. This will make the pupils better understand how to apply the theory to explain the phenomenon in the world...

(Pre-service Student Teacher 09, Entry Interview)

S: Am... good economics teaching would sort of, of course, teach the pupils like the theories, right? But I think it's important to tie the theories to the real world...to use real world examples so that they can put it into context, like for example, if we were going to talk about externalities whatever, like they know the definition, because we tell them or it's in the textbook, but in terms of examples, a lot of textbook use like pollution as a negative externality, but to put it into more like a real-life context, I usually tell them, like if they had a roommate and they are playing the music – music really loud, then they are causing like – sort of like a negative externality to them, so by using am... examples that they can relate to, I think it's easier for them to – to understand the theory.

(In-service Student Teacher 04, Entry Interview)

Table 22.1 Comparison of the way of experiencing displayed by student teachers before and after the Learning study

Categories of ways of experiencing	Number of student teachers (before the Learning study)	Number of student teachers (after the Learning study)
A	2	0
B	8	1
C	1	5
D	4	5
E	2	6

Category E: Good economics teaching as managing to help pupils develop an economic way of thinking for problem solving through pupils' inquiry of real-life phenomena

Student teachers in this category saw good economics teaching as those can help pupils develop an economic way of thinking to make sense of the world around them from an economic perspective. In other words, if the teaching is really successful, the pupils will be able to develop an economics lens to see the world and use the economic concepts learned as an analytical tool to examine real-life phenomena. Structurally, the attention of these student teachers was focused on whether the teaching is able to facilitate the development in pupils of an economic way of thinking or seeing.

S: I think good economics teaching should help pupils solve problems and make decisions. Economics as a discipline studies and explains phenomena happening in the world. If the lesson starts off with an authentic problem and the teacher can then invite pupils to try to use the economic knowledge as well as the logical thinking skills to explain the real-life phenomenon and solve the problem. This would help the pupils develop an economic way of thinking to make sense of the world ...

(Pre-service student teacher 07, Exit Interview)

S: [Good economics teaching] needs to help pupils better understand the world they live... for example, when they do an inquiry of a certain social phenomenon or public issue, they manage to link it up with what they have learned in economics which helps them evaluate the incident in an economic way. Unlike many pupils who said, "After I study the concept of 'opportunity cost', I know 'opportunity cost' only and I know how to score full marks in the public examination", or under the topic 'Demand and Supply', some pupils just learn how to score marks, for example, which lines or signs in a diagram will deserve how many marks, however, they do not really understand the concepts at all. They merely learn the examination techniques. If one encounters a problem or an issue to be solved in the real world, no one will give you a question stem like in the examination question which indicates how many marks and what is required clearly...I think [the teacher] should help the pupils analyze real-life problem or phenomenon and how to handle the problem using economics...

(In-service Student Teacher 08, Exit interview)

As shown in Table 22.1, Categories A to E were identified in the entry interview before the Learning study whereas in the exit interview after the Learning study only Categories B to E were found.

Table 22.2 Distribution of category of way of experiencing among individual student teacher before and after the Learning study

Student teacher	Category before the learning study	Category after the learning study	Change
FT01	B	D	Great positive change
FT02	B	B	No change
FT03	C	E	Great positive change
FT04	B	C	Moderate positive change
FT05	B	C	Moderate positive change
FT06	D	D	No change
FT07	D	E	Moderate positive change
FT08	B	E	Great positive change
FT09	D	D	No change
FT10	E	E	No change
PT01	A	C	Great positive change
PT02	A	C	Great positive change
PT03	B	D	Great positive change
PT04	D	D	No change
PT05	B	E	Great positive change
PT06	B	C	Moderate positive change
PT07	E	E	No change

Based on Table 22.2, seven of the seventeen participants in the study were classified as having great positive changes in their ways of experiencing good economics teaching while another four demonstrated moderate positive changes. The other six teachers demonstrated no changes in their ways of experiencing after engaging in the Learning study. It seemed that many of the student teachers did benefit from this intervention.

In all, the use of the phenomenographic approach to improve the professional learning of student teachers seemed to be effective. In line with the phenomenographic view of learning which denotes a qualitative change in one's way of experiencing the phenomenon or situation, many of the student teachers involved in the study seemed to have developed professional learning as they have displayed a more complex way of experiencing good teaching in economics and demonstrated a progression in their ways of experiencing. All of the student teachers regarded highly the opportunity to comment on and provide feedback to the real lessons conducted by their peers, with the guidance of the teacher educator. The use of provoking reflective questions has helped them focus upon and discern the critical aspects of good teaching in economics which they have not discerned before.

22.4 Conclusion

Overall, the empirical study reported shows how we attempted to foster professional learning using the phenomenographic approach. To reiterate, professional learning is conceptualized as a qualitative change of the learner in his or her way of

experiencing or conception of the phenomenon or situation by phenomenographers. It can be defined in terms of what critical aspects of the phenomenon or situation which the learner simultaneously focuses upon and discerns. If two learners experiencing the same phenomenon or situation simultaneously focus on and discern the same set of critical aspects of it, then according to the variation theory, both of them will exhibit the same way of experiencing the same phenomenon or situation. However, if two learners experiencing the same phenomenon or situation simultaneously focus on and discern different critical aspects of it (which is often the case in the real world), then they will exhibit two different ways of experiencing the same phenomenon. Accordingly, they will act differently to the phenomenon or situation and possibly come up with different outcomes from their acts.

Professional learning is therefore associated with changing discernment of the learner with regard to the phenomenon or situation in question, which implies a change in the critical aspects of the phenomenon which the learner can discern. In other words, the learner, after learning has taken place, has developed the capability of discerning those critical aspects that he or she could not discern before, and/or he or she is capable of discerning the relationship among those critical aspects in a more complex and sophisticated manner than before.

In phenomenography, we posit that the qualitatively different ways of seeing, acquiring meaning, and being understood, can be captured in a set of categories of description that are logically related to one another. Phenomenographic research has shown that this set of qualitatively different ways of seeing can be rewritten in terms of critical aspects, some of which are discerned by certain learners but not by others. In the present theoretical framework, the critical aspects set of the specific entity discerned and focused upon defines how that entity is seen (Marton and Booth 1997), which in turn defines its meaning (or rather one of its meanings). Discerning critical aspects of novel situations enable people to see them in more powerful ways. Seeing novel situations in more powerful ways enable people to act in more powerful ways.

According to Phenomenography and variation theory, in order to improve professional learning for occupational practice, it is important for the teacher to help the learners develop the capabilities to handle novel situations which they may confront in their professions or occupations in powerful ways. It amounts to helping the learners develop a more considered and sophisticated 'way of seeing' novel situations, which enables them to discern those critical features and know what aspects of their knowledge and skills are relevant to the novel situations. The extent to which the learners are capable of handling novel situations in powerful ways depends on the extent to which they have developed the capability to discern the aspects of those situations critical for handling them in powerful ways, i.e. professional learning.

In order to help the learners learn to discern the critical aspects of novel situations, the teacher needs to find out what the situations may appear to the learners and create the necessary conditions of learning to improve professional learning for practice. By allowing the learners with the opportunity to experience certain patterns of variation and invariance in what is dealt with in the learning environment, the teachers can widen the space of learning and empower the learner to discern and focus on the critical aspects simultaneously, which helps develop professional learning.

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Chapter 23

Changing Cultures of Knowledge and Professional Learning

Monika Nerland and Karen Jensen

Abstract This chapter examines the relationship between knowledge cultures and professionals' learning in education and work. An overarching question is: *What roles do knowledge cultures play as constitutive arenas for professional learning and development?* The chapter reviews theoretical and empirical contributions to this topic, focusing on how the relationship between knowledge cultures and learning has been addressed in research on higher education and in the context of professional work. Strengths and weaknesses from different research strands are discussed, and it is proposed that analytical resources from the Social Studies of Science may be helpful for capturing this relationship as dynamic and emergent in practice. Drawing especially on the perspectives of Karin Knorr Cetina, we present findings from two larger Norwegian research projects, where different ways of organizing knowledge and supporting practitioners' continuing learning are compared and discussed as differences in professional knowledge cultures. A premise for this discussion is that professional learning today should be understood in relation to wider ecologies of knowledge and practice, and that the continuing enrolment of practitioners in a profession-specific field of knowledge is a critical condition for participation.

Keywords Knowledge cultures • Epistemic objects • Epistemic practices • Fields of expertise • Professions

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23.1 Changes in Conditions for Learning

The continuous learning of professionals is an increasingly important topic in educational policy, practice and research. Questions of the quality and effectiveness of educational programs when it comes to preparing students for the ‘world of work’, and to ways of engaging and supporting practitioners in further developing expertise in their given field, are critical in the era of the ‘knowledge society’. At the same time as these questions come to the forefront, the environments in which learning and expertise development take place are getting more complex. This is partly related to the dynamics of knowledge itself. As pointed out by social scientists, the way knowledge production is linked with the economy makes advancements in knowledge emerging from numerous sites within and beyond educational institutions and research communities (Bechmann et al. 2009). Furthermore, the ubiquitous presence of information technologies allows the products of these activities to spread rapidly across institutional and geographical boundaries. As noted by Collier and Ong (2005, p. 11), more abstract and symbolic modes of representation give rise to “global forms” of knowledge, forms that have a “capacity for decontextualization and recontextualization, abstractability and movement, across diverse social and cultural situations and spheres of life”. Such forms of knowledge circulate quickly in information networks, and on their way they provide new arenas for engagement as well as resources for community formation.

An important driver in the current dynamics of knowledge production and dissemination is also the co-evolution of new insights and new doubts. While scientific knowledge is believed to provide conclusive answers to societal problems, it is also generally marked with uncertainty and ambiguity. When new results are achieved, they often generate new questions and the need for further knowledge advancement (Knorr Cetina 2007). Fields of expertise are thus marked by stability and instability at the same time, in the sense that their histories and established collective knowledge regulate practices of knowledge production, while new advancements may question the “givens” and call for integrative actions in the expert community.

In the wake of this, the knowledge worlds in which professional learning is embedded are becoming more extensive and complex. Although not all professions may be influenced in the same way or to the same extent, it is generally expected that professionals, as well as their educational programs, keep up with the developments in their field of expertise. In educational contexts, students are presented with knowledge and ways of thinking that are linked with dynamic and geographically dispersed ecologies of knowledge. These wider worlds contribute to defining relevant knowledge and competencies. Moreover, as new technologies and advanced instruments are increasingly used in higher education and work, we cannot take for granted that practitioners’ engagement with knowledge is bounded to given sites. Technologies mediate participation across settings and may bring students in contact with distributed communities that relate to the domain or expert culture but exist external to the educational institution (Francis 2010; Ludvigsen et al. 2011). Educational programs

are, in this respect, more than formal instructional settings; they also provide access points to “disciplinary networks” of knowledge and practices through which people come to participate in multiple ways (Nespor 1994). Such networks could, for instance, include Web-based discussion forums, the activities of expert groups in professional organizations, and work practices of various kinds.

In a wider perspective, the relationship between education and work and the ways in which expertise is valued and comes into play in working life are also changing. One aspect of this is the increased presence of experts in society, which is related to the general rise in educational levels in the population and the development of new fields of expertise (Giddens 1991; Brint 1994). Equally important, however, are the cultural shifts that emerge in a society that places knowledge processes at its core. As noted by the sociologist Karin Knorr Cetina (2001, 2007), development towards a knowledge society brings with it a general focus on knowledge, not only in terms of products to be utilized to solve various kinds of societal challenges but also in terms of the very way of engaging with knowledge. In the words of Knorr Cetina (2001, p. 177), the emergence of the knowledge society thus “involves more than the presence of more experts, more technological gadgets, more specialist rather than participant interpretations. It involves the presence of knowledge processes themselves (...), it involves the presence of epistemic practice.”

She describes this development as a “spillover” of epistemic cultures into other spheres of social life and points to how people increasingly engage in observing and analysing phenomena, and validating and developing knowledge as part of their everyday life and work. This often involves modes of practice that historically have been associated with science communities. Moreover, it involves a shift in collective mentalities and ways of thinking about knowledge, in which transparency in knowledge production and processes—which traditionally has been a core value in science communities—now is extended to include, for example, user communities and requested across occupational sectors and in different types of work (Knorr Cetina 2007).

These developments bring an extended epistemic orientation to education and work, through which the notion of mastering epistemic practices comes forward as an ideal not only for students in academic programs but increasingly also in higher professional programs. For instance, graduates from programs in engineering, nursing, teaching, and accountancy will more often be expected to select, justify, and validate knowledge in the context of work and to engage themselves in opportunities for improvement (Jensen et al. 2012a, b; Nerland and Jensen 2012). Also, these competencies need to be prepared for in the students’ respective educational programs. As proposed by Goodyear and Zenios (2007), a significant task for higher education today is to develop students’ capacities for understanding and creating knowledge in different work settings by developing what they call “epistemic fluency”, which denotes the mastery of epistemic practices and knowing how they may be combined to solve problems and develop collective resources in professional work.

During the last few decades, the importance of involving students in epistemic practices and has been highlighted in higher-education policies and practices across national contexts, in terms of ideas about research-based teaching and

involving undergraduate students in research (Boyer Commission 1998; Elsen et al. 2009; Healey and Jenkins 2009; Brew 2010; Spronken-Smith 2010; Zimbardi and Myatt 2012 iFirst). This is also the case for professional programs and college education (Hu et al. 2008; UHR 2010). Moreover, the idea of considering disciplines and expert domains as not only comprising specialized knowledge but also distinctive knowledge processes seems to be gaining ground in several areas. In a recent report from the US National Research Council (2012) on what is termed Discipline-based educational research in science and engineering, it was stated that more attention should be given to involving students in the “set of investigative processes” that are distinctive for the given domain (Chapter 7, p. 141). Related ideas have been brought forward also in the professional contexts of teaching (Bulterman-Bos 2008; Grossman et al. 2009) and nursing (Elzinga 1990; Reed and Shearer 2011).

In the wake of this, the question of how professionals of today become acquainted with the principles for producing and validating knowledge in specific domains and develop as skilful practitioners capable of identifying, exploring, and utilizing knowledge in relevant ways emerges as a critical topic for research. However, the general emphasis on involving students in epistemic practices and research-like activities does not necessarily mean that these forms of engagement have been equally reflected in the research on professional learning. Moreover, as the processes and principles for developing knowledge and expertise are field-specific and likely to differ between areas of expertise, we need to understand how conditions for learning vary in and between the professions.

The overarching questions we raise in this chapter are: *What roles do wider knowledge cultures play as constitutive arenas for professional learning and development? And, How has this relationship been conceptualised and accounted for in research?* As a start, we address the second question, particularly focusing on research investigating learning in the contexts of education and work, respectively. Examining research in both these contexts and considering how they relate is interesting, as professional learning consists of a longer trajectory that inevitably spans these contexts (Lahn 2011). We show how there seems to be a discrepancy in theoretical constructs between research targeting learning in educational contexts and in professional work, as well as a call for new conceptualisations that better account for the complex and dynamic relationships of knowledge to learning. We then discuss in Sect. 23.3 how concepts and perspectives from Social Studies of Science may allow for an increased understanding of critical dimensions in practitioners’ learning in expert cultures today, and consider how the perspective is used in recent research of relevance for professional learning. In the fourth section, we delve further into this issue and draw on comparative analyses in the two Norwegian research projects ProLearn (2004–2008) and LiKE (2008–2011) to discuss how professional knowledge cultures generate different ways of organizing knowledge and supporting practitioners’ learning, which also seem to span the education-work divide. The chapter concludes by summarising main issues and suggesting some avenues for the future.

23.2 Research on Professional Learning in Education and Work: A Review of Prevalent Strands

23.2.1 *Learning in Higher Education: Socio-cognitive Perspectives*

One of the defining characteristics of a profession is their level of education (Freidson 2001). In today's society, the requirements to practice as a professional within most fields are at minimum a postsecondary education. This is also true for occupational groups such as teachers and engineers, and for the type of professionals that we have in mind in this chapter. Although the educational systems for professionals differ somewhat between countries, there is a general tendency that more programmes are offered by universities and colleges and expected to be research-based. As a consequence, many studies targeting student learning in higher education include students in profession-oriented programmes. Moreover, as these studies often categorise students after their type of programme or specialty, we find it useful to consider this research when discussing the relationship of knowledge cultures to professional learning. At the same time, research on student learning is widespread, as it may be addressed in several research contexts such as higher-education studies, cognitive science, and discipline-specific research. Hence, it is not our ambition to provide a comprehensive review of studies and their results, but rather to discuss some dominant perspectives and traditions in this research field. To do so, we build on some recent review studies in this field.

An overview is provided by Haggis (2009a, b), who reviewed studies published in three leading journals about higher-education research in the period 1970–2007. The selected journals were *Higher Education (HE)*, *Studies in Higher Education (SiHE)*, and *Teaching in Higher Education (THE)*. Haggis draws on Tight (2007) to argue that HE is considered as the leading non-North American international higher education journal, while SiHE is the leading UK-based one. THE represents a more recently established journal that was included to provide variety in the scope and profile of publications. The review was performed as a content analysis, starting with the ways in which learning was conceptualized in the article titles and then identifying what models and research approaches they draw upon. Haggis has also compared her analysis of publications in these journals with publications in two main North American journals (2009a) and with research published in the related areas of adult education and sociolinguistics (2009b). Moreover, the results are compared with key theoretical moves in psychology and sociology in the same period of time (Haggis 2009b).

Haggis' analysis shows that research on student learning in higher education has been dominated by phenomenographic approaches in the given period. This strand of learning research has been developed specifically within higher-education research and grew out of the work of Ference Marton and his colleagues in the

1970s and 1980s (Marton and Säljö 1976a, b; Marton et al. 1984). In this tradition, learning is investigated from the students' perspective, with an interest in revealing the variations in how students understand learning content and the approaches they take as learners (Marton and Booth 1997). Learning is in this research seen as a cognitive phenomenon that is often examined by way of questionnaires and interviews. This has led to important insights about how students differ in their learning approaches, which have been conceptualized as deep, surface, and strategic. Moreover, it has identified significant factors that call for teachers' attention, such as how course work can be designed to support in-depth engagement and critical reflection among students (Entwistle and Peterson 2005).

Socio-cognitive perspectives have also guided other powerful strands of research on student learning in higher education. In particular, this is reflected in research focusing on self-directed learning and, more recently, epistemic beliefs (e.g., Schommer-Aikins et al. 2003; Muis and Sinatra 2006; Bråten et al. 2009). This research has accounted more explicitly for knowledge and identified generic as well as domain-specific issues of critical importance for students' learning and conceptual understanding. For instance, it has shown that students who hold more complex beliefs about knowledge and knowing are more likely to handle complexity in information from multiple sources and to develop a comprehensive understanding of ill-structured phenomena. This research has also pointed to how differences between students may increase over time, as students who have sound conceptual knowledge and metacognitive skills are more likely to handle complex tasks and to benefit from instruction. Hence, it contributes to explaining important differences in students' achievement and how they develop over time.

Common for the research strands described above is that they tend to apply methodologies in which data from individual students and/or teachers are collected through surveys or interviews. While there are signs that the amount of studies based in phenomenography has decreased recently, the amount of survey studies seems to have increased (Tight 2013), which supports this impression. Hence, although we have learned important lessons about the different approaches students take as well as about how different types of conceptions and beliefs influence student achievement, less is known from this research about how students develop expertise in terms of learning to master specific knowledge practices. Moreover, collaborative knowledge practices and engagement across settings are among the issues that tend to fall out of scope.

Haggis (2009b) points to how research on student learning in higher education has employed a somewhat narrow scope of questions and methodologies, compared with other fields of social science and educational research. The turn towards socio-cultural and interactional perspectives that emerged in other fields during the 1980s and 1990s has not been taken up in higher-education research to the same extent. In addition, the development of network theories and approaches that have taken place in sociology during the last decades are not much reflected in research on student learning in higher education. This leads Haggis (2009b, p. 389) to conclude that research into learning in higher education has not accounted sufficiently for "the fleeting', 'the distributed', 'the multiple' and 'the complex'". For the specific

theme of this chapter, we would add that the above described research traditions often have treated knowledge as given and predefined course content to be learned, rather than as dynamic objects that are developed in practice through specific epistemic strategies.

23.2.2 *Disciplinary Cultures*

Within the field of higher education, there is a range of studies that focuses explicitly on knowledge cultures as constitutive for education. The conceptual framing of these studies has often taken the disciplines as a point of departure, and since the implications of disciplinary differences is a core issue, we find it relevant for the questions we raise in this chapter. Of major influence in this tradition are Biglan's (1973) distinctions between disciplines along the two continuums of hard—soft, and pure—applied. The work by Tony Becher (1989, revised version with Paul Trowler 2001) on “Academic tribes and territories: the culture of disciplines” took these ideas further in a broader analysis of disciplinary cultures in the university. Here, culture refers to shared ways of thinking and collective ways of behaving that has epistemological as well as social implications. Academic disciplines are seen to hold norms, values, traditions and belief systems that constitute certain logics of knowledge and knowledge production.

This perspective is first and foremost used to differentiate between disciplines and their social organization, for instance when it comes to whether their logics of knowledge production are oriented towards generalization or specialization, whether the methodological approaches strive towards pluralisation or unification, and whether the relations towards the outside world are marked by openness or closure (Becher and Trowler 2001). In later years, the perspective has also informed a range of research on teaching and curriculum development (e.g. Hativa and Marinovich 1995; Knight and Trowler 2000; Neumann et al. 2002; Mueller 2009). This research has contributed with specifying the knowledge-related and socially related aspects of teaching and learning, for instance along the categories of curriculum, assessment, teaching methodologies, and expectations to students. It has pointed to the importance of recognizing the distinctive features of knowledge domains and their social environments if we are to understand key aspects of teaching and learning. Moreover, some studies have raised an important critique towards the widespread idea in current educational policies that pedagogical approaches and the so-called generic skills are of universal nature. For instance, Jones (2009) showed that types of generic attributes, such as critical thinking, problem solving and communication, are understood and conceptualized quite differently in different disciplines. A core argument following from this study is that such skills emerge through disciplinary forms of engagement and that these specificities need to be accounted for when we use concepts like generic skills and competencies. Brint et al. (2008) analysed data from a survey carried out among students across the University of California system, and showed how students' experiences of academic engagement may be categorized in

two different disciplinary groupings that were conceptualized as the humanities/social sciences and the natural sciences/engineering respectively. As the study revealed considerable differences in norms and expectations to the students' engagement, the authors question the feasibility of promoting pedagogical principles that are believed to be valid across all knowledge domains.

When it comes to research approaches, studies that employ a disciplinary culture perspective largely rest on interviews and self-reported data from academics and students within the contexts of specific universities or educational programs. In this way, individuals' relations to and conceptions of their knowledge domain become a prime unit of analysis. The discipline is often treated as a context for learning, rather than as a dynamic assemblage of knowledge and practices with which the students engage. Hence, while important insights emerge from these studies on an aggregate level, and while it is generally acknowledged that engaging students in research and inquiry-oriented activities is among the most effective ways to develop their conceptual understanding and capabilities to 'think' like an expert in their given field (Healey and Jenkins 2009; Hu et al. 2008), few studies focus on the micro-processes of students' participation and engagement with knowledge during education.

There are, however, some noteworthy exceptions to this picture. One is the long-term ethnographic research program conducted by Janet Donald and her colleagues (Donald 2002), which provides a rich description of the ways in which students in 16 courses across 8 disciplines are introduced to core principles in their field of expertise and, through this, learn to think like experts. The analyses focus on core concepts around which the knowledge activities evolved, the knowledge structure of the course content, its validation principles, and methods of inquiry (e.g., hermeneutics, problem solving, critical reasoning, experiments, examining expertise through personal models or action schemes). The study reveals how "learning to think" implied quite different things and came with different expectations for students in the various disciplines. For instance, while systematic reasoning based on precedent cases was at the core of engagement with knowledge in law, and problem-solving through modelling and procedural exploration was significant in engineering, text-based criticism and creativity in a hermeneutic mode was important in the humanities. By focusing on issues such as validation principles and methods of inquiry, this study addressed core aspects of the epistemic practices that constitute a field of expertise. However, with respect to students learning more broadly, it can be noted that the study primarily focuses on course content and activities and their inherent demands. What it means to think like an expert in the different domains is highlighted, rather than the processes through which such capabilities are developed and commitment to the expert culture is generated.

An unconventional study of the relationship of knowledge to learning is presented by Nespor (1994), who investigates how students are mobilized as learners by the knowledge arrangements in two undergraduate programs of physics and management. Drawing on actor network theory in combination with other sociocultural perspectives, Nespor (1994, p. 131) defines learning as segments of "knowledge in motion" that "follow the shapes of more stable institutional or disciplinary networks". The analytical focus is on the socio-temporal networks of relationships

that produce and reproduce educational tools and practices such as lectures, presentation sheets, notebooks, and social arrangements in auditoriums and classrooms. The ways these elements are enacted and acted upon constitute trajectories that differ in their socio-spatial outreach and shape how students are mobilized and become enrolled in distinct ways. Hence, the discipline is seen as an emergent and networked apparatus more than as a stable context for learning. Although Nespor's focus is on two specific undergraduate programs, the analytical approach utilized in this study is sensitive to how the material tools and practices enacted in these programs are interlinked with wider networks of knowledge. The programs are conceptualized as regions in more complex networks, which simultaneously "concentrate student activity within bounded material organizations of space-time" and link students to "distant sites of disciplinary practice through representational organizations of space-time" (p. 133). This study contributes with new insights by turning the usual analytical focus "upside down" and tracing the networks of knowledge and practices rather than focusing on individuals' engagement. When it comes to disciplinary difference, however, it focuses on space and time relationships in the educational arrangements, but it pays less attention to the epistemic principles and strategies enacted in these spaces. Consequently, it does not attempt to reveal how students develop competencies and learn the epistemic principles of their expert culture by participating in the activities and trajectories offered.

23.2.3 Professional Learning: Socio-cultural Perspectives

In the wider context of research on professional learning, the sociocultural perspectives that emerged in learning theories in the 1990s gained a strong footing in studies of work- and practice-based learning. For research on professional practice, this 'sociocultural turn' was supported by the influential role of the book *Situated learning: legitimate peripheral participation*, which was published by Jean Lave and Etienne Wenger in (1991) and later followed up in e.g. Lave (1993) and Wenger (1998). In this perspective, learning is seen as a process of socialization within expert communities and conceptualized as a movement from being a 'legitimate peripheral participant' to becoming a full member of a professional community. Core concepts launched to analyse these processes were communities of practice, trajectories of participation, and learning to become a competent participant by way of access to, imitation of and identification with practice as enacted by more experienced practitioners. This perspective highlights the social organization of activities and learning as an integrated part of work, as well as the learners' changing capabilities of participation as they move towards more central tasks in the given practice. It has been utilized for studying learning in a range of professional and vocational occupations (see, for instance, Chaiklin and Lave 1993) and paved the way for researchers to reconceptualise and reclaim the value of apprenticeship models (e.g. Nielsen and Kvale 1997). Moreover, the perspective has generated research that underscores the active role of individuals in "remaking" collective practices (Billett et al. 2005;

Billett 2008). However, although this perspective highlights learning as participation in communities and the role artefacts play in this respect, it is primarily oriented towards the social aspects and does not account sufficiently for the epistemic aspects of work and learning, or for transformations in knowledge over time (Lahn and Jensen 2006). Another limitation is the emphasis placed on communities as single, localized and bounded fields of practice, which implies that practice is understood within these boundaries rather than as constituted of complex relations and movements across multiple sites (Jewson 2007).

Another influential strand of research on professional learning has emerged from Cultural Historical Activity Theory (Engeström 1987; Engeström et al. 1999). In this tradition, learning is conceptualized as expansive, embedded in object-oriented activity, and mediated by tools and objects in a given activity system. Development and change is here understood as driven by contradictions in and between activity systems. The concept of an activity system includes material and symbolic resources and the way these are negotiated and transformed as people engage with the object of activity, as well as the activity's dependencies on institutional characteristics like division of work. Moreover, the idea of activities as object-mediated refers to a double meaning of the object, referring to its instrumental character as well as its mediating function (Miettinen 1999; Lahn and Jensen 2006). Research within this line of theory typically takes the activity system as its unit of analysis, with an increasing interest in how new practices emerge at the interface of two or more activity systems, and how organizational change can be facilitated in researcher-practitioner collaborations around joint creation of artefacts and objects (e.g. Engeström 2001). Human action is seen as essentially mediated, and the role of artefacts and objects in facilitating change is a core issue. Recent developments in this theory also develop models to understand dialogue, multiple perspectives, and networks of interacting activity systems, hence taking into account several of the shortcomings pointed to in Haggis' (2009a, b) review of students learning in higher education. However, activity-theoretical studies of professional learning in educational contexts are sparse, as most studies that address the professions are carried out in work settings. And, as argued by Lahn and Jensen (2006) and Lahn (2011) in their accounts of models for professional learning, the activity-theoretical perspective has not accounted sufficiently for how epistemic shifts are generated from knowledge-dependent practices and cultures of contemporary working life. Although discussed by Miettinen and Virkkunen (2005) and Engeström and Blackler (2005) as emerging interests, even these more recent socio-cultural approaches to studying professional learning have tended to downplay the role of knowledge in the formation of expert communities.

23.2.4 *Summing Up*

The above review of research strands suggests that research on professional practice and learning show a more varied picture than the reviews on student learning in higher education, and that the former to a larger extent has developed ways of

accounting for learning that are sensitive to shifts in knowledge and the dynamic and multifaceted dimensions of knowledge work. These approaches are however hardly ever brought into studies of professional learning in educational contexts, and they are still somewhat restricted when it comes to ways of addressing wider networks and ecologies of knowledge. This is probably due to the fact that they often take artefact-mediated practices as their focus of analysis, rather than the knowledge culture in which these objects and practices are embedded. The research on disciplinary cultures, on the other hand, does focus on the knowledge cultures in play. However this research tends to treat knowledge as a more predefined content to be learned, and does not sufficiently account for the knowledge dynamics and practices through which students become enrolled and develop expertise. Moreover, it tends to focus on traditional academic disciplines rather than professional knowledge cultures. Hence, while all research strands provide significant contributions to our understanding of professional learning, important gaps emerge between them when it comes to understanding the relationship of knowledge cultures to learning. In the next section, we suggest that concepts and perspectives from Social Studies of Science may be useful in addressing this topic.

23.3 Capturing the Relationship of Knowledge Cultures to Professional Learning: Analytical Resources from Social Studies of Science

In recent years, researchers have turned to network theories and developments within *Social Studies of Science* to find concepts and perspectives that may supplement existing research and shed light on how newcomers become enrolled and participate in expert cultures today (see Hakkarainen et al. 2004 and Fenwick et al. 2011 for an overview of approaches in this respect). Of particular interest for our purpose is the work of sociologist Karin Knorr Cetina (1999, 2001) and her perspectives on epistemic cultures and object relations. Our reason for highlighting her work is twofold. First, she provides a perspective on expert knowledge that accounts for how knowledge is developed and shared in socio-historical contexts over time. Second, her conceptualisation of knowledge cultures provides analytical tools for differentiating between the professions and their distinct ways of handling knowledge. By using the term “epistemic cultures”, Knorr Cetina draws attention to the logics and arrangements through which knowledge comes into being and is circulated, approached, and collectively recognized within science and other expert communities. These logics and arrangements comprise tools, artefacts, and institutional arrangements, but also the specific strategies, visions, and procedures that constitute collective actions and form the “machinery of knowledge construction”, which, in a given area of expertise, “make up how we know what we know” (Knorr Cetina 1999, p. 1). Epistemic cultures hold, on the one hand, some common features that are shared across domains. For instance, the general expectations in today’s society about making processes of knowledge production transparent, and about

including user value as one criterion for recognising valuable knowledge, influence strategies for how knowledge is produced, validated and circulated across fields of expertise (Knorr Cetina 2002; Bechmann et al. 2009). On the other hand, logics and arrangements for knowledge production and circulation carry features that are distinctive for the knowledge domain in question and thus provide analytical means for distinguishing between different expert cultures.

While the concept originally was launched to study and conceptualize different cultures of knowledge production in the sciences (Knorr Cetina 1999), she has later extended her focus and used the same ideas to study other types of expert communities (Knorr Cetina and Bruegger 2000) and to conceptualize knowledge relations in professional settings (Knorr Cetina 2001, 2006). In one sense, her approach resembles the above described work on the cultures of disciplines (Biglan 1973; Becher and Trowler 2001) which has been influential in higher education research. However, by focusing more explicitly on the practices and webs of relations through which knowledge is produced and circulated, Knorr Cetina provides a dynamic framework that allows for investigating the very practices of inquiry in which experts—and students—engage. Moreover, the focus on knowledge processes and practices contributes to untying the concept from discipline-specific knowledge structures as well as from strong boundaries between contexts of production and contexts of use. As Knorr Cetina (1999, p. 2) argues, the concept of disciplines has been important to capture the differentiation of knowledge, but it has not sufficiently captured the strategies and policies of knowing that inform expert practice. Hence, her ambition is to “make visible the complex texture of knowledge as practiced in the deep social spaces of modern institutions”, and, to do so, it is necessary to “magnify the space of knowledge-in-action” (Knorr Cetina 1999, pp. 2–3).

A core concept to understand knowledge cultures and practices is epistemic objects. Expert communities are typically object-centred, in the sense that they are oriented toward exploring, developing, and mobilizing knowledge objects (Knorr Cetina 2001). Such objects are, however, not understood as separate, material things. Rather, they may be described as complex amalgams of material and symbolic resources that constitute knowledge around a problem and, through their inherent complexity, activate a set of opportunities when they are approached (Nerland and Jensen 2012). Moreover, following Knorr Cetina’s definition, epistemic objects are characterized by their unfolding and question-generating character. As she explains, “Since epistemic objects are always in the process of being materially defined, they continually acquire new properties and change the ones they have” (Knorr Cetina 2001, p. 181). In the context of professional work and learning, epistemic objects could be models for medical treatment, computer programs, legal texts, and complex representations of financial markets. They are created in epistemic cultures and further developed as people in different settings attend to them, explore their complexity, and materialize their potential in local activities.

For student and novice practitioners, engagement with epistemic objects may be regarded as an access point to their relevant expert culture and its collective ways of knowing (Jensen and Lahn 2005; Nerland and Jensen 2012). Moreover, they may stimulate learning by their ways of generating epistemic practices when they are approached. They typically carry structuring principles for practice, at the

same time as they may be approached in different ways in variegated settings. For instance, in some contexts they are subjected to validation efforts, testing, and types of evidence-making oriented toward closure and (preliminary) fixedness. In other contexts, they form an explorative site where questions and possibilities are opened up in an elaborative manner, which process may in turn envision new instantiations and possibilities. The dynamic interplay of these processes may involve students and novice practitioners in core epistemic practices in their expert domain.

From this perspective, the types and roles of epistemic objects in a professional environment will influence practitioners' opportunities for learning. The circulation of such objects is also constitutive for the ways local work is linked with wider knowledge circuits, and the types of intermediaries (Callon 1991) that are powerful in this respect. However, the role of epistemic objects is not limited to access to knowledge and participation in knowledge practices. As such objects typically incorporate suggestions for action and principles for how they might be used or explored, they also serve to construct and position the knower. In Knorr Cetina's words, they mediate the collective "epistementality", that is, a shared belief system that forms how knowledge is understood and envisioned in the given expert culture. Such epistementalities may, for instance, vary in their ways of emphasising control, complexity, and experience (Kastenhofer 2007).

In recent years, these analytical resources have been used to some extent to investigate knowledge practices and learning in different professions and types of expert work. Ewenstein and Whyte (2009), for instance, employed the concept of epistemic objects to reveal how visual representations in architectural design had an unfolding ontology that displayed incompleteness and were constantly in flux rather than fully formed. The interplay between these epistemic objects and technical, more frozen objects was important in the design process. Similar dynamics have been described in knowledge practices mediated by drawings in engineering (Bechky 2003) and clinical guidelines in nursing (Nerland and Jensen 2012). Mørk et al. (2008) investigated inter-professional knowledge production in a medical research and development organization and found differences between the epistemic assumptions and strategies of doctors, nurses, radiologists and engineers that generated obstacles for learning across the expert groups. Other researchers have focused on how practitioners from different areas of expertise collaborate in revealing and developing shared epistemic objects (Edwards 2010; Guile 2010). Knorr Cetina herself has, in collaboration with colleagues, investigated how objectual practices play out in the work of financial traders (Knorr Cetina and Bruegger 2000) and also explored how even financial information and economic transactions are mobilized and carried out by way of epistemic practices (Knorr Cetina and Preda 2001). Analyses of novice practitioners' relationships with knowledge have shown how the interplay between professionals and their knowledge objects generate opportunities for learning across space and time (Nerland and Jensen 2010) as well as a commitment to knowledge and a desire to engage in further explorations beyond what is known (Jensen 2007; Rudberg 2012).

In higher education, studies that draw on these analytical resources are scarce. However some examples do exist. Damsa et al. (2010) used the concept of shared epistemic agency to investigate how groups of university students collaboratively

created shared knowledge objects in the context of instructional design activities, and showed how this type of agency was constituted and differently articulated in different groups. Hence, the group dynamics and the collective epistemic strategies matter for the students' experience. Jensen and Lahn (2005) showed how nursing students engage with the concept of care as a knowledge object that incorporates ideas generated through science but at the same time presents itself as an open-ended object which allows for—and asks for—multiple interpretations and use. They describe how students first find the abstract, decontextualized world of theory challenging, but that the “back-and-forward looping between theoretical input and practical experience” (p. 313) offered in the educational program seems to involve the students in objectual dynamics and create ties to knowledge over time. Finally, Muukkonen et al. (2010) studied knowledge-creative practices around shared epistemic objects in student teams in the context of an undergraduate project management course. Here, students were distributed on teams that were geographically dispersed and presented with complex problems based on assignments from two customers in working life. The analysis showed how students, although somewhat distressed with the open-ended character of the problem during the process, benefitted from being involved in knowledge creation and inquiry-oriented processes over time. For these activities to be productive in students' learning, however, careful scaffolding of knowledge practices as well as team processes is needed.

To investigate further how students and novice professionals get access to and participate in epistemic practices, and through this become inducted in cultures of expertise, it is suggested that more research could benefit from drawing on the analytical resources described above. Interestingly, a similar concern has been raised from within the Social Studies of Science traditions, where researchers have pointed to a need for understanding not only how expert cultures operate but also how they come into being and are maintained through the on-going enrolment of new members (Meyer and Molyneux-Hodgson 2009). The Norwegian projects ProLearn (2004–2008) and LiKE (2008–2011) have drawn on these analytical resources and conducted comparative analyses of the relationship of knowledge cultures to learning in four professions. Although explorative in nature, interesting differences between the professions have been identified. In the next section we describe and discuss core findings from these studies.

23.4 Knowledge Cultures as ‘Educational Systems’

In the ProLearn project (*Professional Learning in a Changing Society*), we used the concepts of knowledge cultures, objectual practices and epistementalities as sources of inspiration to analyse how collective ways of organizing and engaging with knowledge in different professions constitute opportunities for learning (see Jensen et al., Eds 2012b, for a more extensive description of the project and its findings). The targeted groups were nurses, school teachers, auditors and computer engineers. The project followed novice practitioners in their transition from education to work,

as well as in two time periods in working life, by means of questionnaires, interviews, and learning logs.¹ We also conducted document analyses of curricula and core policy documents in the relevant professional associations, as well as targeted case studies of knowledge practices in working life. Together the analyses revealed interesting similarities between the knowledge cultures, but also considerable differences among the groups in terms of how they orient themselves towards knowledge and in the character of the wider knowledge worlds in which they engage. Moreover, the analyses indicated that professional cultures in which local practices are linked with extended networks and circuits of knowledge in a systematic and strategic way were more likely to foster an epistementality geared towards learning and continuous exploration among its members. In this respect, the character of the knowledge infrastructures and artefacts available for practitioners is important. To learn more about these dynamics, the LiKE project (*Learning Trajectories in Knowledge Economies*) was designed to conduct follow-up studies in the same professions that focused more in-depth on knowledge practices that evolved around epistemic objects and artefacts in professional work. This project comprised observation-based case studies in selected work settings, as well as follow-up interviews and questionnaires among the participants in the ProLearn project.

In what follows, we draw on these projects to discuss significant features of professional knowledge cultures as “educational systems” and how they serve to shape professionals’ practice-based learning. First, we describe and discuss similarities and differences in the respective professions’ knowledge relations and knowledge processes that create overall conditions for learning. Next, we look closer into what we see as a significant dynamism in professional learning, namely the practitioners’ relation to and engagement with epistemic objects. In the context of the latter, we also discuss how the work and learning of professionals today is embedded in wider “machineries of knowledge construction” that span organizational boundaries and present practitioners with new demands and responsibilities, but also new opportunities for epistemic engagement.

23.4.1 Professional Knowledge Cultures and Their Ways of Shaping Conditions for Learning

Across the four targeted groups, our analyses revealed that novice practitioners experience shifting knowledge demands in their work situations that call upon them to renew their competencies and ways of working. In the interviews, participants across the professions described how they experienced a knowledge domain that

¹ The project was carried out in the Department of Education, University of Oslo, in collaboration with the Center for Studies of the Professions at the Oslo and Akershus University College of Applied Sciences. The longitudinal survey “StudData – Database for Studies of Recruitment and Qualification in the Professions” was used as a basis for selection of participants for the qualitative studies.

was in development and that was influenced by external sites for knowledge advancement, be it scientific, technological or legislative impulses. Examples of developments that occurred during the research period are new procedures and approaches for solving professional tasks, such as risk auditing for the accountants and agile software development for the computer engineers (Mathisen and Nerland 2012). Nurses' work and learning demands were often related to new advancements in medicine (Christiansen 2010; Jensen et al. 2012a, b). Although the teachers described more stability in their core tasks and professional challenges, they were presented to new regulatory demands such as shifts in curriculum models that required an attitude towards continuous learning and development (Jensen et al. 2012a, b; Strand and Jensen 2012). Hence, professional practices are in all cases embedded in dynamic fields of knowledge, and practitioners in all professions seem to have embraced identities as knowledge seekers and lifelong learners (Jensen 2007).

An interesting finding across the professional groups concerns the role professional education plays in connecting students to their field of expertise and developing habits for knowledge seeking. Analyses of what kind of knowledge sources the students engage with during education and later in working life suggest that their habits from education seem to be continued in working life (Smeby 2012). For instance, nursing students approached scientific journals and research-based knowledge during education to find answers to their questions and continued to do so in working life. Teachers did not establish these habits during education, and were correspondingly less active in approaching research-based knowledge in their work. Moreover, students' experiences of insufficient competencies when graduating is not necessarily a sign of weaknesses in educational programs, but could in fact indicate that the students' have developed a commitment to their field of expertise as well as capabilities of identifying the 'black holes' in their knowledge base and the need for further learning (Smeby 2007). Becoming enrolled in cultures of expertise is in this respect not only about becoming a competent knower but also about developing capacities for critical engagement with knowledge and epistemic curiosity, which is important to handle complex knowledge challenges today (Jensen and Christiansen 2012; Nerland and Jensen 2007).

While practitioners in all groups seemed to develop a sense of commitment to their field of expertise during education, we found interesting differences in the professions' ways of organizing knowledge and opportunities for learning. To identify and conceptualise these differences, we developed further Knorr Cetina's (1999) notion of knowledge cultures as "machineries of knowledge construction". We understand such machineries to comprise logics and arrangements through which knowledge is developed, circulated, accumulated, and applied in professional settings. Of particular relevance for understanding professional knowledge cultures and their ways of influencing learning are the types of intermediaries through which knowledge circulates and become accessible; the temporal and spatial scale of knowledge practices and participation; and the collective belief systems and epistemic orientations that emerge through the former aspects (Nerland 2008, 2012a).

Starting with the computer engineers, their knowledge culture is marked by a ubiquitous presence of information structures and technological objects. Knowledge

is circulated in information networks in ways that invite the engineers to keep in touch with the latest technological advancements while performing everyday work. This is supported by standards and codified knowledge, such as programming languages, which makes it possible to share knowledge across organizational and national boundaries. Moreover, the engagement with technological objects invites engineers to explore and develop knowledge as part of their problem solving activities. Systems, programmes, and codes can always be improved to be more efficient, more widely applicable, or more complex in their functionalities. In the moment of resolving a technical problem by means of, e.g., applying distributed codes or “best practices”, new possibilities and untried functionalities appear. The implications for practice-based learning are, first, that such representations of knowledge allow for an externalisation of learning and knowledge engagement that makes opportunities visible and generate curiosity and further exploration. As one engineer expressed it; “In fact the most important thing is to realise the potential of the system you are working with. As you learn more about it, you also see many new opportunities” (Nerland 2008, p. 61). Second, the type of intermediaries in this knowledge culture serves to link practitioners with circuits of knowledge that reach far beyond their current workplace. One example is the web-based forums and discussion groups facilitated by the large technology providers, such as java.net, where practitioners are invited to share their experiences with technologies and solutions to problems and in this way also to contribute to further advancements in their expert culture. Although novice practitioners themselves may not be very active in posting messages in these forums (Lahn 2012), they come in touch with others’ work by following discussions. Characteristic for this knowledge culture is that the development of profession-specific knowledge pursues technological advancements, and that knowledge distribution goes beyond the boundaries of the profession. For the computer engineers, these arrangements imply an individualization of responsibilities for continuous learning in which each practitioner is called upon to stay updated and manage his/her own career in a deliberate manner, sometimes within contexts of conflicting demands where short-term requirements and long-term interests do not go well together (Nerland 2012b).

The knowledge culture of nursing is also characterized by a plenitude of material tools and support structures. However, in contrast to the computer engineers, nurses are provided with a range of knowledge tools and resources that have been specifically designed for the profession, including manuals, intranet, reference works and textbooks (Christiansen 2010; Lahn and Christiansen 2012; Klette and Smeby 2012). They also receive systematic supervision from colleagues and have access to a wide range of specialised expertise in their work contexts. Of particular interest in this regard is the role of the clinical nurse developer in larger hospitals, who is equipped with the task to bring science-based advancements into the practices at the ward (Jensen and Christiansen 2012; Christiansen et al. 2009). Hence, the types of intermediaries are manifold and the materiality of the knowledge culture is miscellaneous and rich. While relations to science-generated knowledge are emphasised in this culture, considerable efforts are devoted to organising collective ways of validating and translating such knowledge for use in professional practice.

Here, the development of procedural standards for nurses' work is important. Such procedures link local and universal expressions of knowledge, and provide opportunities for learning in their development and use (Nes and Moen 2010; Moen and Nes 2012; Nerland and Jensen 2012; Nerland and Karseth 2013). Hence, while nurses get access to larger knowledge worlds in their everyday work, the knowledge practices and settings in which they participate are more often locally organized and have a more profession-specific character. This interplay between the local and the global seems to spur explicit engagement with knowledge also beyond the frontline work with clients. Our analyses revealed that nurses often wanted to learn more about the medical problems they faced (Lahn 2012) and that they volunteered to participate in developing work procedures (Jensen and Christiansen 2012). There was a general concern among practitioners for ensuring that they are familiar with research-based advancements and current collective procedures for good practice, which seems to stimulate learning (Jensen 2007).

The knowledge culture of accountancy is first and foremost marked by a strong emphasis on legislation and formal standards for work. While national agencies play a key role in this respect, the profession is heavily influenced by international legislation. Audit standards are often initiated and developed by transnational professional bodies such as the International Accountancy Federation, and literally translated into Norwegian for use in the Norwegian fiscal sector (Nerland and Karseth 2013). Nevertheless, such formal regulations build on and are turned into collective knowledge in the profession. Important intermediaries in this culture are a profession-specific language and terminology, which makes the sharing and use of distributed knowledge sources possible. Textual resources are also important, such as documents and books describing current standards and how they should be used. Moreover, the profession has initiated and developed an advanced, web-based audit support system called Descartes, which aims at supporting practitioners in following the current standard for risk-based auditing. This system is used by approximately 75 % of the members of professional association for accountants in Norway. It incorporates current standards, procedures and guiding models for audit work, and at the same time forms a site in which audit work is performed and documented (Mathisen and Nerland 2012). Through their engagement with current standards and models of best practice for auditing in their given line of business, auditors become involved in networks of knowledge that extend way beyond their local workplace. The emphasis on standards and legislation in this expert culture implies that parts of the practitioners' learning is highly formalised. In our projects, the accountants are the only ones who face formal requirements to attend courses and participate in training as part of their duties, and the only ones whose competencies need to be recertified. At the same time, however, the temporal arrangements and distribution of tasks over the annual year make it possible to focus on learning and competence development in certain work periods (Mathisen 2012). Moreover, our analyses suggest that the shifts in standards and regulations call upon practitioners to explore their meaning and implications in ways that stimulate analytic and epistemic modes of engagement (Mathisen and Nerland 2012). Standards are not simply ready to be used in the audit of specific clients. Rather, they need to be

explored and specified in each work context. This seems to generate epistemic engagement to fill the gap between the universal and the specific, as well as an interest in exploring the meaning of the standard beyond what is needed in the given situation (*ibid.*). Among practitioners, this informal learning is regarded as just as important as formal training, and also as something that makes their work exciting. As one auditor expressed it; “So many people have a misconception of this profession, and it is remarkable how long-lived the myth of the ‘correcting read pen’ is. That’s not what it is about anymore. It is a fantastic and exciting profession”.

The knowledge culture of teachers is characterized by strong emphasis on experience-based knowledge and face-to-face models of knowledge sharing. A common narrative is that the individual teacher needs to build up a wide repertoire of first-hand experiences gained in a variety of teaching and learning situations (Nerland 2012a). Moreover, this has been regarded as a core model for developing the profession’s collective knowledge base, in the sense that individual teachers have been encouraged to share and bring their experiences ‘upwards’ in their profession in this way to develop collective, agreed-upon examples of good practice (Karseth and Nerland 2007). Practitioners in this field describe a limited use of profession-specific knowledge resources from outside the local community, with the exception of factual knowledge related to subject matters they are to teach. When the teachers refer to research within their own profession or to extended circuits of knowledge, this contact has more sporadic character (Klette and Carlsten 2012; Klette and Smeby 2012). This seems to be related to a general resistance towards standardised procedures and work approaches in this profession. Both the Teachers’ Union and teachers themselves have been concerned with protecting the individual teachers’ right to teach in his or her preferred way, as a means to secure a space for professional discretion (Karseth and Nerland 2007). As a consequence, learning in the workplace is related to informal interaction and knowledge sharing within the local school, in which the learning professional is implicitly asked to take personal responsibility for seeking out advice and ideas. The strength of this model is that engagement with knowledge takes place close to its application in practical teaching, and that it allows individual and organisational learning in the workplace to coalesce. The possible limitations include that it may be difficult to exceed the local boundaries and thus to reconceptualise current practice, and that the practitioners are not offered the sense of excitement that being in contact with wider circuits of knowledge development may provide. While the professional mandate of supporting students’ learning and development is wide-embracing and complex in character, and thus offers questions and concerns that may invite learning, the lack of systematized knowledge and procedures makes it difficult to find answers to problems and clear directions for learning (Klette and Carlsten 2012). In recent times, however, we have noticed signs that the knowledge culture of school teachers is about to change in terms of a stronger emphasis given to specialization, to formalisation of work approaches, and to profession-specific knowledge generated through research (Strand and Jensen 2012; Nerland and Karseth 2013). For instance, initiatives to develop shared principles for assessment across schools and communities generate templates and standards that need to be explored and developed locally, thus

encouraging epistemic practices (Hermansen and Nerland 2013). However the strong emphasis on differentiating knowledge and practice to meet the needs of the individual student, together with time pressures and extensive demands for “front stage performances” at work, makes it difficult for teachers to see their own learning as a project distinct from that of their students’ learning.

In sum, these differences point to how collective ways of developing, sharing and understanding knowledge in the respective professions generate different conditions for learning as well as ways of positioning the learner. While the cultures of nursing and accountancy highlight collective knowledge, standardized procedures and consistency in the performance of work, they also stimulate analytical and explorative engagement in the intersection between the general and the specific. The cultures of computer engineering and teaching both place more emphasis on differentiation and individual choices in processes of knowledge application. In nursing and accountancy learning is more formalised and collectively regulated, while the knowledge arrangements in teaching and computer engineering imply an individualisation of responsibilities for learning. What it means to engage in learning is, however, highly different within these groupings. For instance, the support structures for handling individualised responsibilities are highly different in computer engineering and teaching. While computer engineers are positioned as career managers whose prime task is to keep up with advancements in an international technological field of expertise, teachers are positioned as experiential learners whose engagement often evolves around the challenges and needs of their current students.

Practitioners are through these arrangements invited to participate in practices that have a different temporal and spatial scale. The analyses in the ProLearn and LiKE projects suggest that professional cultures in which local practices are linked with extended networks and circuits of knowledge in a systematic and strategic way seem better equipped to stimulate and support continuous learning among their practitioners. In this respect, the character of knowledge resources and infrastructures is important. In the next section, we discuss how practitioners’ learning and continuing enrolment in their expert culture depend on dynamic relationships with epistemic objects, conceptualized as objectual practice.

23.4.2 Objectual Practice: A Significant Dynamism in Professional Learning

The term objectual practice is used by Knorr Cetina (2001) as a way of accounting for how practitioners not only rely on routine-based actions but increasingly engage in creative-constructive actions of reinventing practice and exploring knowledge beyond what is known. Such processes are mediated by material and semiotic objects, which in our times often have a complex form and incorporate abstract as well as concrete modes of representation. In the ProLearn and LiKE projects we have developed this idea further to explore and conceptualize how knowledge practices and learning is stimulated in a dynamic interplay between subjects and

objects, with a special interest in how practitioners become involved in learning when exploring complex problems by approaching different knowledge resources and identifying unfulfilled opportunities or temporary solutions (Nerland and Jensen 2010, 2012). In what follows we illustrate these mechanisms by highlighting how different knowledge challenges involve professionals in objectual practices; how such object relations give rise to community formation; and how epistemic objects and practices are embedded in wider epistemic contexts.

One aspect of this dynamic is the ways engagement with epistemic objects may stimulate interchanging modes of experimental and confirmative practice. For instance, computer engineers often search for best practices and source codes on the Internet and use these to solve local problems in programming tasks. Such actions are oriented towards closure and lead to a preliminary solution (Lahn 2012). However, when applied as part of larger activities such resources need to be combined and adjusted in ways that also involve analysis and exploration. The collaborative work of identifying best practices and programming patterns to be applied in a software project was by our informants described as a process of negotiation and inquiry, in which the temperature could get high and the discussion quite lively. In such phases, practitioners need to explore and validate the resources at hand, as well as creating imaginary scenarios of what the different choices could imply. Moving back and forth between the confirmative and the explorative was a core driver in their learning, which was mediated and even spurred by the knowledge objects at hand (Nerland and Jensen 2010).

This example also points to another aspect of objectual practice, namely the capacity of complex knowledge objects to invite engagement along short and long timescales simultaneously. Knorr Cetina (2007, p. 373) describes practices that evolve around epistemic objects as geared towards the future, in the sense that they “continually open up new questions and determine new frameworks of knowing”. Such processes do not only call upon practitioners to make use of existing knowledge but also to engage with its possible development in the future. To use another example from computer engineering, programming tasks seemed to be resolved with a twofold attention towards the present and the future. When developing a computer program, the engineers were concerned that it should not only respond to the given specifications, but also be prepared for future changes and incorporate possibilities for adding new functionalities (Nerland and Jensen 2010). Similar dynamics came to the fore in hospital nurses’ work with developing clinical procedures by way of assessing, selecting and translating scientific evidence for local needs. Here, professionals discussed the possible implications of their epistemic choices for different types of practice (Nes and Moen 2010). At the same time, they kept in mind that such procedures are based on the best knowledge available at a certain moment of time, and need to be updated and aligned with new scientific evidence in the future (Nerland and Jensen 2012). In this way, prospective scenarios become both a basis for engagement with objects and incorporated in their materiality, thus contributing to shaping the realms of future practices.

A third aspect of objectual practice is the capacity of epistemic objects to invite and support community formation. By calling attention to unresolved problems and

questions for people to engage in, epistemic objects may bring professionals together and form a focal point to which humans and their visions, epistemic strategies and procedures become interlinked. In our material, we found examples of knowledge communities of temporary character, defined by a specific problem and its possible solutions, as well as communities formed around more enduring knowledge objects. For instance, in nursing, practitioners formed specialized communities devoted to the development of clinical procedures to be used in particular medical contexts, such as the care of patients with lung diseases or prenatal care (Jensen and Christiansen 2012; Nerland and Jensen 2012). These communities span organizational boundaries and involved nurses from different work organisations, librarians, and distributed resources such as databases of research articles. Another example is engineers who form around a certain technology (“I am a J2EE engineer”) and share knowledge of this specialty in web-based environments. Even in teaching, we found related mechanisms at play when a group of teachers formed to examine and further develop research-based guidelines for student assessment to be used across their school (Hermansen and Nerland 2013). Such mechanisms of community formation in object-centred environments are well described in the context of research groups and in technology-driven areas such as hacker communities and the open source movement (Knorr Cetina 1997). Our analyses suggest that community formation around epistemic objects also take place in other types of professional work, which may be interpreted as signs of the suggested “spillover” of epistemic cultures and practices to other areas of social life (Knorr Cetina 2001, 2006).

Finally, an important aspect of objectual practice is the capacity of epistemic objects to link practices across knowledge settings and communities. Epistemic objects are typically shared across sites and levels in expert cultures. They incorporate important features of the knowledge culture in which they are generated, and may at the same time be used for different purposes in local activities. As complex amalgams of material and symbolic resources that constitute knowledge around a problem (Nerland and Jensen 2012), they inform local practice at the same time as this practice is linked with extended knowledge worlds. The outreach of these connections depends on the character of the knowledge challenge in question. Some types of problems and their knowledge relations are, for instance, more nationally bounded, while others are formed by more global circuits of knowledge and have a transnational outreach. In our analyses, we noticed that practitioners whose knowledge cultures included rich material devices and information structures were more in contact with, as well as stimulated by, wider knowledge circuits. For instance, auditors’ practices were linked with national and international standards for risk auditing through the work support system Descartes (Mathisen 2012; Mathisen and Nerland 2012). In a similar vein, nurses came in contact with specialized international communities and their terminologies, knowledge sources and arenas for knowledge sharing through their work on approving and developing clinical procedures (Jensen and Christiansen 2012; Nerland and Jensen 2012). These practices contribute to making professionals’ knowledge engagement visible and provide opportunities for engagement in which knowledge itself forms the object of exploration.

In sum, we would argue that the dynamics of objectual practice place professionals in a position to not only ‘consume’ but also contribute to knowledge production in their professional communities (Knorr Cetina 2001; Meyer and Molyneux-Hodgson 2009). Moreover, through the circulation and engagement with epistemic objects in various contexts, different settings and levels in the expert culture become linked. In this regard, object relations are important not only for learning but also for the continuation and further development of the expert culture. The circulation of and engagement with objects across organisational boundaries creates new challenges as well as new opportunities for learning and epistemic engagement. Understanding these dynamics, we will argue, is important for understanding conditions for professional learning today.

23.5 Conclusion and Suggestions for the Future

This chapter has examined how knowledge cultures shape opportunities for learning in distinct ways, as well as how this relationship of knowledge cultures to learning has been accounted for in research targeting professional education and work. While research on learning in higher education has been dominated by methodologies that target the individual student or practitioner, and research on work-based professional learning has emphasised students’ initiation into single and historically given communities of practice, the situation today calls for more research that examines the processes by which practitioners become enrolled, and manage to stay enrolled, in dynamic and changing knowledge cultures. To address this dimension of professional learning, we introduced ideas and concepts from Social Studies of Science, and especially from the work of Karin Knorr Cetina. This perspective and its analytical resources draw attention to the significant role epistemic objects and infrastructures play in professional’s learning, not only as mediating tools to solve present working tasks but also as structures that link between the local and the global and connect practitioners with wider circuits of knowledge.

Being part of these circuits is increasingly important to stay enrolled in expert cultures whose collective knowledge shifts over time. Moreover, engagement with complex knowledge objects that are shared in the expert culture creates conditions for motivation and desire as well as opportunities to contribute to collective knowledge development. In this respect, we suggest that access to participate in variegated knowledge practices and engage with epistemic objects in professional setting is at least as important for professional learning as more formal educational requirements and activities. Such opportunities may keep the relations between local work settings and the professions’ wider machinery of knowledge construction dynamic, and support the development of practice over time. Hence, these dimensions should be taken into account in our ways of discussing ‘educational systems’ for professional and practice-based learning, as well as in efforts to support such learning.

The chapter has also pointed to a need for more research on these issues, in different professional and educational contexts. Inspired by the differences

identified in our projects, as well as by the studies of Knorr Cetina (1999, 2007) and Kastenhofer (2007), we suggest that further research on knowledge cultures and learning in the professions should focus on the temporal and spatial scale of their activities; the ways in which they de- and recontextualize knowledge; their ways of dealing with complexity and uncertainty; their ways of handling the unforeseen; and their degree of inter- and transdisciplinary reflexivity. For instance, what is the spatial outreach of the learning activities in a given programme or in a work context? To what extent is knowledge represented in universal and ‘global’ forms which travel across sites? To what extent is its validity and use more experience-oriented and generated from below in locally bounded communities? And, to what extent are ways of employing knowledge geared towards unification or towards differentiation?

To address these questions, attention should be focused towards knowledge settings and processes rather than towards individual practitioners and bounded activities. This may also contribute to our understanding of modern societies as such, because, as Knorr Cetina (1999, p. 8) states, “the study of knowledge settings becomes a goal in the attempts to understand not only science and expertise but also the type of society that runs on knowledge and expertise”. At the same time, epistemic cultures and practices cannot be studied at a single analytical site. The examinations undertaken in the ProLearn and LiKE projects bring attention to how professional knowledge cultures are dispersed across a variety of sites, in which people come to participate in multiple ways and the processes and products of different activities are interlinked in complex ‘machineries’ of knowledge construction. In this respect the emergence of new actors and knowledge-verifying organizations, such as professional bodies at transnational levels, clearinghouses, and standard-setting agencies, should be taken into account. These “macro-epistemic” agencies (Knorr Cetina 2007, p. 367) contribute to creating and circulating knowledge objects in their respective expert cultures, which practitioners in different settings may come to explore and develop. While they certainly serve to regulate practice-based learning in distinct ways, they may also provide new opportunities for engagement. Hence, there is a need for research that investigates knowledge cultures and processes across and between sites, and that also traces knowledge-related connections between sites and societal levels. In this regard, recent perspectives on socio-material practices may be helpful (see, for instance, Nespor 1994 and Fenwick et al. 2011).

Finally, given that the latter described research traditions to a small extent have gained footing in research on learning in educational contexts, we suggest that more research should be conducted that focuses on the interplay of knowledge cultures and learning in professional education. The proposed perspective on knowledge cultures spans the education-work divide, as it focuses on the expert culture and its knowledge arrangements rather than on organizational contexts. One interesting question to explore in this regard is how students get access to core epistemic practices and principles in their expert culture by engaging in objectual practices during education.

By “magnifying” knowledge processes and their constitutive capacities, the analytical perspective discussed here provide conceptual tools for exploring the interplay between epistemic communities, objects, and practices as it plays out across sites in a field of expertise. At the micro level, it draws attention to the role of epistemic objects in the processes of knowing, and, in this respect, to their transformative as well as stabilising effects upon practice. In a wider perspective, it highlights the interdependency between expert cultures and their practices, the epistemic objects created by and offered in these practices, and the role of such objects in connecting individuals to their wider field of expertise. By doing so, it provides opportunities for studying how knowledge practices stretch beyond the boundaries of local communities or work organisations, which is increasingly important to account for in a complex society based on a multiplicity of epistemic agencies and sites of knowledge production.

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Part IV

Practice-Based Learning Activities

This part comprises reviews and analyses of the current state of research on work-related learning activities occurring outside educational institutions – e.g. workplaces, everyday life, private environments – covering intentional as well as incidental learning. Central to this part is understanding, illustrating and elaborating the roles that practice-based learning activities play in the development of occupational identity and capacities, as well as being utilised as sites for ongoing professional learning across lengthening working lives. Included here are contributions that adopt the educational lexicon and discourse to understand, legitimated and illustrate the ways which practice-based activities and experiences are central to professional formation.

In the opening contribution to this part, Anneli Eteläpelto, Katja Vähäsantanen, Päivi Hökkä, and Susanna Paloniemi make the central case about the importance of individuals' engagement with practice-based experiences for their professional learning. Entitled – *Identity and agency in professional learning* (Chap. 24) – it describes and illustrates the ways in which professional identities and professional agency mediate workplace learning at both the individual and work-community level. They commence by outlining some of the key challenges to professional practice and the role that learning for and through practice can be aligned with those challenges. The authors next develop a case for the centrality of both agency and identity as key mediating factors in individuals' learning, of which learning through work is no exception. Next, they offer a set of characteristics of effective learning through and for work and emphasise the centrality of learner agency within these characteristics. Taking a specific approach to promoting professional learning, Jan Breckwoldt, Hans Gruber, and Andreas Wittmann in that chapter entitled – *Simulation learning* (Chap. 25) – set out by identifying different kinds of simulations and their use for assisting individuals initially learn and further develop their occupational capacities. The scoping of that purpose includes the ability to engage in activities and learn from them while minimising potential harm to others, consequences for organisations and at the same time provide access to activities in circumstances which promote authenticity as part of the experience. They also identify

the premises upon which the efficacy of simulations for learning professional knowledge is premised. These include a consideration of its limitations as well as contributions. In particular, the authors focus on the use of electronically mediated simulations and their application to learning in and through health care. Through this occupational context the case is made for how simulations can be used to promote effective professional learning. Following this contribution on simulation learning, the chapter by Christian Harteis and Johannes Bauer – *Learning from errors at work* (Chap. 26) – elaborates an aspect of simulations and an approach to supporting learning in its own right. Discussing what constitutes errors and how they can be used productively to support learning in and through work, this chapter reviews what is currently understood about this process and its applicability to a range of occupations and professional practice and also the kinds of conditions under which learning through errors can be effective. Drawing upon a range of studies and also examples, this chapter sets out bases for understanding how errors can be used to promote professional learning and the important contextual issues associated with what constitutes errors, error cultures, how they are enacted and how errors are perceived by individuals in workplaces, handled organisationally and used to develop professional capacities.

Stephen Billett and Raymond Smith in their chapter – *Learning in the circumstances of professional practice* (Chap. 27) – propose that learning through practice has been, and continues to be, the principal process through which work, the production of goods and services on which human society depends, is enacted and developed. They hold that work can be viewed from many personal and social perspectives. It may be seen in terms of occupations and professions and vocations that are entered into, taken up, learned and practiced through doing what is necessary to make a way in the world, to secure a present and future livelihood. Equally, it may be seen in terms of skill development and deployment, structured and guided participation in culturally organised practice and their formation and positioning, also the transformation and repositioning, of knowledge, identities, systems and values. So, work is a complex human activity that can be viewed from many different perspectives, each enabling some illumination of how it is enacted and accomplished as a personal and social practice. In all, they propose that, work and the socio-personal practices by which it is recognised and conducted can be understood as workers' engagement in and the legacies of being and learning in circumstances of professional practice. Understanding how people learn through their work, through their experiences in circumstances of professional practice, and potentially seeking to promote and improve that learning is important for the continuing and sustained development of the people, systems and resources necessary to human flourishing and the production of goods and services on which this depends. Complementing this account, Geoffrey Gowlland uses an anthropological approach to detail the processes and efficacies of – *Apprenticeship as a model for learning in and through professional practice* (Chap. 28). Differentiating between traditional and modern forms of apprenticeship, he argues that they can be characterised as a mostly non-didactic way of teaching and learning, grounded in a local context and dependent on participation of the learner in work-related activities, he makes the case for its

applicability to learning in and through professional practice. The acquisition of skills during an apprenticeship involves, among others, social participation and interaction, observation and imitation, and engagement through the senses with tools and materials. He holds that apprenticeship is not simply an educational context in which learners acquire technical skills, but a learning environment in which worldviews, ethical engagement and moral values – in particular related to work, work identities, class, gender, and the place and role of artisans and skilled workers in society – are shaped as part and parcel of the process of learning. In doing so, he proposes a model of supporting learning within and through professional practice which likely has applicability to professional learning per se.

Britta Herbig and Andreas Müller contribution focuses on the kinds of knowing and knowledge which is used by professionals in performing that work and yet may be difficult for them to articulate and to be captured through research procedures. Entitled – *Implicit knowledge and work performance* (Chap. 29) – the authors refer to the central role played by these forms of knowledge which are hard to declare. They give attention to the ways in which implicit forms of knowledge and knowing go beyond the person and shape the way individuals come to work together, in teams for instance. The authors use the dimensions of personal and collaborative implicit knowledge to describe and illustrate the characteristics of this form of knowing and its contribution to both work and its necessity for professional learning. They also refer to the limitations of knowledge which has been learnt to the degree by which its application is often enacted with minimal conscious monitoring. Following from this consideration of implicit knowledge, Eugene Sadler-Smith's chapter – *Intuition in professional and practice-based learning* (Chap. 30) – sets out to define and theorise what constitutes intuition and, in particular its contribution to professional practice and learning. He does this by explaining the role of intuition within expert performance by adopting dual processing theory, then mapping distinctions between intuitive expertise from heuristics and biases and other types of intuition. Next, the conditions under which intuitive expertise succeeds or fails are described. Then, he identifies a set of factors influencing the acquisition of intuitive expertise through activities and interactions in professional settings. Then, some practical implications are advanced for educators and others whose focus is on the development of intuitive expertise in professional contexts.

Bente Elkjaer and Ulrik Brandt in that chapter – *An organisational perspective on professionals' learning* (Chap. 31) – connect with a theme raised in the first part about the changing character of the professions and contemporary professional practice with its rich associations to employing organisations. In particular, they engage with issues of professional knowledge, knowledge sharing, learning and identity within the context of learning within organisations. In doing this, they outline the field of what constitutes organisational learning and how this contributes to understanding professional learning. In particular, they based their analysis on three distinct perspectives to assist and use these to elaborate a case for the role of professionals within organisations and how their learning and development can be understood. Morten Sommer in his chapter – *Professional learning in the ambulance service* (Chap. 32) – provides a case of how the need for continuous learning across

working life can be addressed through practice-based experiences. He argues that because of the crucial nature of their work, ambulance service personnel need to be continually learning and developing their expertise. Drawing upon a study involving participant observation, he argues that much if not most of the learning required across these professionals working lives can be developed through practice-based experiences. Moreover, these are likely to be the most effective and engaging of experiences. Nevertheless, he also proposes that educational interventions are sometimes warranted and essential. Importantly, he refers to the different kinds of experiences that these personnel engage with as meeting particular kinds of needs and that the organisation and enactment of learning experiences needs to focus on identifying and then selecting appropriate experiences, albeit in practice or educational settings. It is the two sets of contributions, that in conjunction can assist sustain these workers capacities across their working lives.

Finally, Stephen Billett in his chapter – *Mimetic learning at work: Learning through and across professional working lives* (Chap. 33) – seeks to explain the actual process of learning in and through professional practice and across working lives. Drawing upon historical, anthropological, cultural and sociocultural psychological ideas, the process of human learning through mimesis (i.e. observation and imitation) is discussed and illustrated, and then elaborated into a broader scheme comprising mimetic learning. This scheme acknowledges the dual contributions of both inter-psychological (i.e. between the person and the world beyond them) and intra-psychological (i.e. those within the person) processes. Beyond outlining the processes and the conceptual and empirical justifications for them, this chapter also seeks to redress a societal bias which privileges learning experiences within educational programs and experiences and tends to ignore or downplay the contributions from outside of those kinds of experiences. It is proposed that processes such as observation and imitation are high order activities and are fundamental to human cognition and learning and as such as well is occurring all the time and every day they are central to learning and individuals' development across the life course. This approach to understanding human learning and development is held to explain more comprehensively than accounts emphasising either the social contributions to learning or accounts emphasising cognitive processes. Moreover, it seems to be the central process that humans have used across their history to learn, innovate and advance culture and society.

Chapter 24

Identity and Agency in Professional Learning

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and Susanna Paloniemi

Abstract This chapter elaborates professional learning from two complementary perspectives, namely professional identity and agency. Starting with the conceptualization of identity and agency, the chapter illustrates how professional identity and agency are intertwined with workplace learning at the individual and social levels. In theoretical terms we adhere to a subject-centred socio-cultural approach. This implies that professional learning is seen as a dual process, involving identity negotiation and the development of work practices (including the practice of agency), with both aspects taking place within the socio-cultural and material conditions of the workplace. We see professional identity as constituted by subjects' conceptions of themselves as professional actors, i.e. as individuals with professional commitments, ideals, interests, beliefs, values, and ethical standards. Agency is needed for the renegotiation of work identities, and for the continuous and innovative development of work practices. We see professional agency as being exercised when professional subjects and/or communities influence, make choices, and take stances on their work and/or their professional identities. The chapter summarizes evidence on the constraints and resources that appear to be most influential for professional identity negotiations and for the practice of professional agency at work, especially in education and health care work. Empirical evidence is presented on aspects operating at the work community, work organization, and individual levels. As a practical conclusion, it is suggested that there is a need for practice-based interventions that will promote professional learning concurrently at the individual and social levels. Such interventions will involve agency-centred couplings between these levels.

Keywords Professional identity • Professional agency • Professional learning • Promoting professional agency • Practice-based multi-level intervention

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24.1 Why Identity and Agency Are Relevant to Professional Learning

Recent trends within working life have increased the need for professional learning. Today's global market economy is intensely competitive, requiring companies to improve their productivity. In part this is accomplished by promoting learning and creativity with a view to developing new products and more efficient work practices. Global competition further implies that companies will pursue cheaper labour costs. As a consequence, even highly skilled employees may lose their jobs in countries with expensive labour costs. Employees are increasingly obliged to find a new job or to enter into the labour market as contingent workers, i.e. persons who actively construct their careers and work identities as private entrepreneurs (e.g. Fenwick 2006). In a parallel development, public sector organizations dealing with education, health care, and social services now operate in regimes strongly dominated by financial considerations. They are continuously required to cut back and to improve productivity through more efficient work practices and new managerial models. All these trends involve a need for individual employees, work communities, and work organizations to be flexible and creative if they are to survive these developments and find productive ways forward. For individual workers this will require continuous professional learning and the renegotiation of professional identities (e.g. Chappell et al. 2007). For work organizations this will mean challenges in terms of continuously reshaping work practices, introducing creative and collaborative ways of acting, crossing traditional professional boundaries, and adopting new inter-professional ways of working.

In recent years, many public sector organizations have introduced new public management (NPM) practices. These are manifested as moves towards tightened accountability and decreased professional autonomy (e.g. Lindblad and Goodson 2010; Moos 2009). Narrow ways of measuring productivity have produced conflicts between productivity indicators and subjects' professional commitments, ethics, and ideals – aspects that comprise the core of employees' professional identities (Day 2002; Hargreaves and Shirley 2009). If these ways of understanding work performance are accompanied by a higher workload and a reduced sense of meaningfulness at work (Green 2007), it can be expected to lead to troubled identities and to create serious constraints on shared professional learning at work. This is especially harmful for professionals such as teachers and nurses, who are required to use their personal identities within their work.

Research on professional learning has produced considerable empirical evidence on how professional identities and their renegotiation are intertwined with professional learning (Billett 2006a, b, 2008; Brown et al. 2007; Kirpal 2004). There have also been indications of the extent to which the renegotiation of work identities is necessary for reforms in work practices and organizations (Hökkä et al. 2008; Vähäsantanen and Eteläpelto 2011). If work identities do not change, the anticipated gains from organizational reforms will not be realized. Moreover, professionals may find themselves unable to adopt new practices or to act in creative ways, due to

the difficulty or impossibility of changing work identities. It is thus widely agreed that work identities and their renegotiation are necessary elements in professional learning.

Since both learning and the renegotiation¹ of professional identities are active and constructive processes, subjects and work communities need to practise active influence (exercise agency) for these processes to take place. Furthermore, such agency is needed if people are to suggest new and creative ways of working, or to exert influence on work practices. The constant changes that take place in work organizations make it all the more necessary to exercise professional agency. All in all, it seems that agency in general and professional agency in particular is needed for professional learning, professional identity negotiations, and the transformation of work practices.

In this chapter, our focus on a relationship between professional learning, identities, and agency is bound up with our view that professional learning is not to be seen solely as a matter of acquiring knowledge and professional competencies, or updating skills. Here we are in accord with recent discussions emphasizing the extent to which workplace learning comprises also the formation and transformation of professional identities, in conjunction with the shaping of work practices (Billett 2008; Billett and Somerville 2004; Hager 2011; Lin and Bound 2011). All in all, since work-based learning is closely intertwined with working and thus takes place in and through work, we would argue that the promotion of workplace learning must go hand in hand with the development of work practices. In this chapter, we see professional learning as a dual process in which identity is negotiated and work practices are developed, with both aspects taking place within the socio-cultural and material conditions of the workplace.

Our aim in this chapter is to elaborate professional learning from two complementary perspectives, namely professional identity and agency. The chapter includes examples of the role and manifestations of professional identity and agency, and how these influence and intertwine with professional learning in the workplace. We utilize research evidence drawn from different professional learning contexts, but deriving mainly from research conducted within public sector organizations (i.e. schools, hospitals), particularly in the sectors of health care (i.e. nurses and doctors) and education (i.e. teachers and teacher educators). The chapter will further address the aspects of the workplace context (i.e. socio-cultural and material) that appear to be most influential from the perspective of professional identity negotiations, and the practice of professional agency at work. The empirical evidence presented involves professional learning at the work community, work organization, and individual levels.

¹In this chapter we use the concept of *identity construction* in referring to the initial phase of identity formation, for example, among novice workers when they construct their sense of self in relation to their vocation and work. By *identity negotiation* we refer to the continuous and on-going processes taking place in the everyday situational practices of the workplace. In contrast, *identity renegotiation* refers to situations which impel or even require employees to modify their work identities. Typical situations of this kind include organizational reforms and changes in subjects' work tasks, duties, and responsibilities.

Taking these notions of professional learning as a starting point, we suggest that work practices should be developed in such a way that they promote learning at multiple levels, encompassing the work organization, the work community, and individual employees. So far, most interventions for developing work practices have operated at the individual or the work community/organizational levels. For the future, we would argue that there is a need for practice-based interventions that will promote work-based learning at the individual, work community, and work organization levels concurrently. In addition, such interventions will need to create linkages between the different levels. In theoretical terms we adhere to a subject-centred socio-cultural approach. We assume that professional agency is necessary for professional learning and that these aspects are closely intertwined with individual professional identities. We hold that the negotiation of professional identities takes place in workplace contexts and within changing work practices, and we therefore believe that it is necessary for professional identities be renegotiated within any changes that occur. We further hold that the successful implementation of changes will be greatly influenced by subjects' sense of agency in coping with the changes in question.

The following section (Sect. 24.2) will take up the concept of professional identity and how it is understood in the workplace context. Thereafter (Sect. 24.3), we examine the concept of agency, and consider how agency is intertwined with professional learning.

24.2 Professional Identity in the Workplace Context

Here we seek first of all to clarify the concept of professional identity (Sect. 24.2.1) and to specify how we understand its relationship with the socio-cultural and material conditions of the workplace (Sect. 24.2.2). Thereafter (Sect. 24.2.3), we consider contextual factors related to professional identity negotiations.

24.2.1 Understanding Professional Identity

Professional identity has been generally understood as the individual's self-conception as a professional subject. It thus encompasses the relationships between individual subjects and their work, and involves what is seen important at work, including the subject's commitments, affiliations, ethical standards, and identifications at work (Beijaard et al. 2004; Billett 2007; Eteläpelto 2008; Kirpal et al. 2007; van Veen and Slegers 2009; Vähäsantanen et al. 2008). Slightly different shades of meanings are connected to the concepts of occupational, vocational, professional, and work identities,² although all of these refer to subjects' sense of self in relation to multiple aspects of their work.

²The terminology in the field is not strictly demarcated, but tendencies can be identified. *Occupational identity* broadly refers to the identities of a range of occupational fields, such as the metal industry, health care, banking services, and agriculture. *Vocational identity* refers to more personal aspects of identity in various vocational fields. It has connotations of personal commitment,

In addition to differences emerging from the different aspects of work, the concept of identity has also been understood differently within different theoretical frameworks. Billett (2006a; see also Mansfield 2000) has suggested a distinction between four historical traditions which have a fairly distinct understanding of identity and the related concept of self. The early humanist tradition saw the individual self as autonomous and as separated from social structures. The key ideas in this conception of the autonomous self were based on idealist philosophers; here one can identify Rousseau's idea of the absolute freedom of individual experience, Descartes' rationalist ideas of "I think therefore I am" and Heidegger's "authentic individualism". Within this framework learning was seen as the free and spontaneous expression of the self and of self-actualization (Rogers 1969). In contrast with this, the role of the social, material, and cultural context for individual identity was seen quite differently within a second approach representing structuralist theories (as seen in Marxist theory and in the early writings of Foucault). These theories placed an emphasis on material conditions and social structures, with identities being seen as subjugated to these structures. Individuals were thus seen as "placeholders" within the social and material structures in question.

The third tradition represents a (late) modernity conception of an enterprising self. The self is seen as the property of reflective, entrepreneurial individuals – persons who maintain their identity and sense of self within structures, but who are nevertheless able to transform these structures (du Gay 1996). The fourth conception of identity has been put forward within the post-structural tradition (McNay 2004). The post-structural self is seen as individually selective and as negotiating actively and relationally within social conditions. Thus the post-structural self is seen as practising agency through resisting, outmanoeuvring, and avoiding strong social suggestions, while creating a social position which is consistent with individual subjectivity and identity (Billett 2006a, 14–15). The post-structural conception of identity thus suggests that individuals practise fairly strong agency in renegotiating their identities, and in influencing social practices.

In recent discussion of professional identity, the ingredients of all four historical layers have been present. However, different emphases may be placed on the roles of contexts and agency, and thus on how strongly social and material conditions are seen as determining the nature of individual identities, and of employees' sense of self. In our understanding of professional identities, we have adopted the basic foundations of the socio-cultural approach, emphasizing the important role played

perhaps involving a mission to take care of or educate other people. *Professional identity* operates at a general level, and the term is used in this chapter to refer to professional employees' identities in relation to their work, as opposed to hobby-like activities. Interestingly, in everyday speech the term "professional" is often connected to high status vocations that demand the kind of highly valued expertise gained through higher education. Thus, lawyers and medical doctors/physicians are often seen as "professionals," while teachers and nurses may be seen more as "semi-professionals" or "borderline professionals". *Work identity* has a fairly similar meaning to professional identity, as used in the more general (non-evaluative) sense, but it tends to refer to more concrete or everyday work activities. In its most comprehensive connotations it overlaps with the concept of *work-related identity*, which covers also the role of work in the subject's entire life-sphere, and includes also free time and family life (see Kirpal 2004).

by social and material conditions and by the workplace context. However, consistent with notions of the post-structural and enterprising self, we hold that individuals are not mere placeholders within structures. We argue that in fact they always practise some degree of agency in negotiating their identity positions, and further, in transforming the practices of their work communities. Socio-cultural theories exist in different versions, derived from Vygotskian educational theorists (Rogoff 1990), cultural and developmental psychologists (Cole 1996; Billett 2006a, b), scholars addressing situated action and learning (Lave and Wenger 1991), communities of practice theory (Wenger 1998), cultural historical activity theory (Stetsenko 2005), scholars focusing primarily on language as a mediated tool (Wertsch 1997), and scholars addressing (for example) distributed cognition (Hutchins 1991).

Overall, one can identify differences between socio-cultural scholars in terms of how they see the ontology of human action and learning, and also in relation to the analytical separation of contextual and social aspects of reality. For our part, rather than adopting approaches that deny personal identity and agency, we adhere to theoretical notions within the socio-cultural approach that recognize the importance of the (working) subject and the role of individual identity and agency, without, however, denying the role of the social and cultural context (Billett 2006a, b; Eteläpelto 2008; Evans 2007; Fuller and Unwin 2004; Hager 2011; Hodkinson and Hodkinson 2004; Hodkinson et al. 2008). In line with our position, Billett (2006a, b) has suggested that more emphasis should be placed on the identities of individuals. Although human actions have a social genesis, they also emerge from subjects' personal histories. Out of different kinds of individual engagements, individuals learn different things (e.g. Eteläpelto et al. 2005). Human action and learning are in this way linked ontogenetically to individuals' subjectivities and identities. In terms of the study of human learning in social practices, including those of the workplace, this implies a need to consider subjects' sense of their professional self in terms of their interests, goals, commitments, and ethical standards – all this in addition to the goals and continuities of social practice, including the possibility of an active role in its remaking (Billett 2006a, b; see also Eteläpelto and Saarinen 2006; Vähäsantanen and Eteläpelto 2011).

Informed by these notions, we understand professional identity to be constituted by subjects' conceptions of themselves as professional actors – conceptions based on the subject's individual life-history and work experiences (e.g. Lamote and Engels 2010). Professional identity includes subjects' professional commitments, ideals, interests, beliefs and values, ethical standards, and moral obligations (Beijaard et al. 2004; Canrinus et al. 2011; Little and Bartlett 2002; Vähäsantanen and Eteläpelto 2011). It also includes future prospects: individuals have goals, aspirations, and notions of the kind of professional individual they desire to become. Professional identities are negotiated interdependently within the local socio-cultural and material context of the workplace (Beijaard et al. 2004; Hökkä et al. 2008; Kelchtermans 2009; Kirpal 2004; Lamote and Engels 2010; Paloniemi and Collin 2010; Vähäsantanen et al. 2008).

Empirical studies based on ethnographic observations have shown that in professional identity negotiations, socio-cultural and material conditions provide

necessary resources, but can also act as constraints – or even insuperable obstacles – that impede professional learning, identity renegotiation, or the development of work practices. If we are seeking to find pedagogical tools or practical solutions that will contribute to professional learning and professional identity renegotiation in authentic work contexts, we need to understand the main resources and obstacles affecting these. Previous studies have demonstrated that these vary according to the nature and organization of the work. For example, in a hospital operating room, located in a hierarchically organized hospital context, professional learning and identity negotiations are greatly influenced by material conditions, technical tools, inter-professional relations, and official power relations between nurses and surgeons (e.g. Collin et al. 2010). In contrast, the professional identities of teachers are strongly influenced by the teacher's personal beliefs and commitments, and by his or her professional orientations, competencies, and work histories (Hökkä 2012; Vähäsantanen and Eteläpelto 2011). Note, however, that in both the hospital and the teaching context, socio-cultural and material conditions have the potential to either promote or impede professional identity negotiation.

The following sub-sections will consider in detail various kinds of professional identities, examining how professional identities are constructed and negotiated, and how they are connected with the contextual constraints and resources of work organizations. Research evidence will be presented, indicating the most important resources and constraints affecting identity renegotiations in work organizations. In this connection, we also refer to findings on the nature of the agentic processes needed for the renegotiation of work identities in situations of change.

24.2.2 Professional Identities Are Negotiated at the Intersection of the Individual and the Social

It is widely agreed that professional identities are negotiated at the intersection of the individual and the social. However, as the previous sub-section has shown, the emphasis differs according to different notions of identity. In recent years, many scholars have emphasized that professional identity construction and negotiation is not simply a matter of adopting certain socially pre-existent and prescribed identities emerging from social suggestions.³ Instead, the emphasis has been on the significance of individual agency in the identity negotiations that take place in relation to workplace settings (Beijaard et al. 2004; Billett and Somerville 2004; Day et al. 2006; Kirpal 2004). Taking a nuanced view, it has been suggested that individuals are significant actors in the construction of their professional identity, even if this identity is also influenced by other people and by social practices (Akkerman and Meijer 2011; Brown 1997; FAME Consortium 2007).

³Such suggestions have been assumed to include changing cultural practices and cultural norms, along with situational demands, constraints, and opportunities (e.g. Billett 2007).

Following this line of inquiry, a useful starting point for an examination of identity negotiation is to see identity-formation as a process which occurs in relationships between the individual and the social, and which is shaped by, premised upon, and mediated by the practice of agency (e.g. Billett 2006b; Vähäsantanen 2013). Exercising agency means that individual professionals will negotiate their identities amid (i) individual contributions and (ii) social suggestions, utilizing both of these within negotiating processes. This understanding of professional identity negotiations (and the practice of agency) has to a large extent been informed by socio-cultural and post-structural approaches (Billett 2008; Eteläpelto 2008; Hökkä et al. 2012; McNay 2004; Paloniemi and Collin 2010; Vähäsantanen and Eteläpelto 2011).

Although individual aspects have been increasingly emphasized with regard to professional identity negotiations, it should be noted that there are differences between occupational fields in terms of the social determination of professional identities. In a comprehensive study over five occupational fields covering seven European countries, Kirpal (2004) showed that there were significant differences between occupational fields in the social determination of professional identities. For example, in the metal industry and in health care, professional identities were found to exhibit fairly strong social determination and as a consequence strong continuity with previous forms of identity. In the case of nurses, Kirpal (2004) concluded that in nursing, identity formation has tended to remain heavily social in character (see also Paloniemi and Collin 2010). Nursing has long traditions of vocational education and working life practices, and its institutional mechanisms maintain traditional forms of collective identity formation. By contrast, in other fields such as information technology and the travel industry there has been less social determination, and traditional occupational identities have tended to be decomposed (Kirpal 2004). This implies that the findings on the nature of professional identity construction and renegotiation cannot easily be generalized from one occupational field to another.

Nor should findings be generalized from one profession to another, even within the same occupational field. For example, in the medical field there are major differences between nurses and medical clinicians in terms of social and individual spaces for identity negotiations. In contrast to nurses, medical clinicians, who have a higher status in the professional hierarchy, have traditionally had more professional autonomy and clinical freedom – a factor that has had important consequences for the formation of their professional identity (Bejerot and Hasselbladh 2011; Doolin 2002; Numerato et al. 2012). However, this does not mean that the social aspects of their work, such as official work practices, would have no influence on clinicians' identity construction. Indeed, a study on the identity construction of surgeons and residents suggests that when clinicians are faced with a conflict between their work practices (e.g. contents, tasks) and their professional identity, they solve the conflict by “customizing” who they are (i.e. their professional identity) to match what they do (i.e. their professional practice). Customization is facilitated by looking towards role models in the work community, and by socialization within a particular hospital culture (Pratt et al. 2006). These findings illustrate the complex mutual interdependence between workplace practices and professional identities, and how these are renegotiated in workplace contexts (Paloniemi and Collin 2010).

The complexity of identity negotiations and their individual nature is further evidenced by findings on individual differences in professional identities within the same profession and the same social context. Indeed, there is considerable empirical evidence indicating that subjects' professional identities can be quite different within the same work context. Vähäsantanen et al. (2008) found four types of teacher identity among vocational teachers and teacher educators (with each group working in the same organization). The authors made a distinction between teacher identities representing (i) an educational orientation, (ii) a subject-matter orientation, (iii) a network orientation, and (iv) a research and development orientation. This illustrates how the nature of teachers' professional identities can vary among individual teachers, rather than being similar among all teachers within the same organization (see also Canrinus et al. 2011; van Veen and Slegers 2006). From this it would appear that social settings, norms, structures, and cultures do not alone determine or shape how teachers see themselves as professionals. It further implies that teachers with different priorities tend to focus on different competencies within their work. The gaining of these competencies constitutes their professional learning. All in all, observations of this kind suggest that the process is, at least in part, person-dependent.

Along similar lines, individually varying professional identities were found among health care professionals working in the same surgical ward (Paloniemi and Collin 2010). The identities of surgeons and surgical nurses had something in common, in so far as they were linked to a surgical specialization within the disciplines of medicine and nursing; hence they could be perceived broadly as surgical identities. However, there were differences in terms of (i) how work-related identities were constituted in relation to other areas of life, and (ii) how work identities were negotiated within the work community in relation to other professionals and professional groups. From this perspective, identities at work can be seen as re-constructed and negotiated within continuous collective practices, in relation to other professionals and professional groups.

To sum up, professional identity negotiations constantly occur within the socio-cultural and material conditions of the workplaces in question. However, identity negotiations are, at the same time, individual and personal processes intertwined with subjects' individual backgrounds, commitments, ideals, and future goals. Both individual and social aspects can thus act as resources for identity negotiations, and hence for professional learning. The following sub-section will examine in more detail the aspects of contextual and individual resources that have been found to have a critical influence on identity negotiations.

24.2.3 Contextual and Individual Factors Relating to Professional Identity Negotiations

Work and workplaces are influential contexts for individuals' professional identity construction, since they offer (concurrently) social suggestions and resources for participating in social practices, and thus for negotiation of an identity. Professional

identities are constructed by participation in the practices and discourses of work organizations. Within this process, organizational norms and instructions may be appropriated, ignored, or resisted (Fenwick and Somerville 2006; Wells 2007), although these can never be merely wished away. Work and workplaces offer social suggestions that can both support and hinder professional identity renegotiations. Up to now, professional identity construction has been studied especially in relation to becoming a professional, such as teacher, during a person's first practical experiences or in the initial stages of a career (Lamote and Engels 2010). However, professional identity negotiations are increasingly being studied among experienced professionals (teachers) faced by changing work contexts (van Veen and Slegers 2006; 2009; Day and Kington 2008; Vähäsantanen 2013). These studies have demonstrated that educational reforms constitute one of the most important contextual factors requiring professional identity renegotiation and transformation.

Within the workplace, the construction and negotiation of a work-related identity is an on-going process, one that is influenced by the various work tasks, domain ideals, work communities, and situations that come up in people's lives as whole. In the health care sector, the identity construction of medical residents and doctors has been described as a matter of multivoiced negotiations that are full of potential dilemmas (Löyttyniemi 2004). In such negotiations, balances are sought: between life control and drifting in the flow of life, in combining career and family, and in defining one's commitments and ethnicity. In addition, young doctors in particular, but also other young professionals such as young teachers (Eteläpelto and Saarinen 2006), need to constantly negotiate between an "ideal" and a "real" identity. Professionals – as represented for example in the everyday discourses of a layperson – are, ideally, supposed to have total commitment to their profession, to make the work the central content of their lives, and to be constantly successful in the conduct of their professional duties. However, there are problems if one unreservedly adopts the ideal professional as a constituent of one's professional identity. In practice, the idealized norms need to be partly identified with and partly questioned in relation to the resources and constraints in one's environment. This implies practising agency via the negotiation of a suitable subject position for oneself in the work community (Hökkä 2012). In such negotiations, individual resources have an important role.

Differences in individual resources are often based on individuals' prior work experience and consequent differences in their competencies and status-positions in the work community. In addition, individual employees' strengths and interests are often embedded and intertwined with their individual resources (e.g. Billett 2010; Eraut 2010). A study on developing surgical identities provides an example of negotiation processes between the individual's professional interests and the resources and opportunities available in the organization (Paloniemi and Collin 2010). In this kind of situation, individuals start to build their own way of seeing the work, and to make decisions on the aspects that may be most important to them in the profession and in professional practice. Since these are not necessarily in line with the views of more experienced colleagues, junior professionals need to struggle against hierarchies and adopt the ways of working which they believe to be right. This is

different from the situation faced by nurses and surgeons who have had years of experience, and who have gained a highly respected status (based on their competencies) in their working communities. In so doing, such individuals have gained a stable position in their own group (see also Kraus 2006), and have been able to practise strong agency in their work communities. In any case, the exercise of agency is never a matter of unrestrictedly free choice; rather it is constrained by the power and the options that one has to do what is possible under certain circumstances, in the context of the resources and constraints available (Fenwick 2004; Giddens 1984; Paloniemi and Collin 2010).

In respect of professional identity among health care and education professionals there has been a good deal of research in recent years on the impact of managerial cultures, and especially the new public management (NPM) model as it affects (for example) professionalism and autonomy (Bejerot and Hasselbladh 2011; Doolin 2002; Numerato et al. 2012; Vähäsantanen et al. 2008), changes in work identities (Goodrick and Reay 2009; Machin et al. 2011), and social identification within a profession (Burford 2012; Weaver et al. 2011). Studies conducted in educational organizations, for instance, have shown that different work organizations and their managerial cultures create different opportunities for exercising individual agency and for renegotiating professional identities. If the management culture is “loose and weak” it has been shown to provide much space for teachers’ professional identity negotiations and for agency (in terms of influencing the contents and conditions of the work). By contrast, if the management culture of the organization is strong and tight, the organization seems to create more constraints on the practice of professional agency, tending to maintain a particular form of identity (Hökkä and Vähäsantanen 2013; Vähäsantanen et al. 2008).

Other studies (e.g. Hökkä et al. 2008) in the domain of education have indicated that individual autonomy, in situations of ample resources for individual identity negotiation, does not promote transformations of collective professional practices. On the contrary, it seems to bring with it serious constraints on work-based learning at the social and organizational level. The most important obstacle observed in the study by Hökkä et al. (2008) was a lack of collaboration across work communities. In addition, an analysis of organizational discourses indicated that the hegemonic discourse of the organization can act as an important resource but also as an impediment in terms of identity renegotiation (Hökkä et al. 2010). Furthermore, tight boundaries between different competing groups and teams within the work organization have been found to act as obstacles for identity negotiations and for collective professional learning. It appears that tight boundaries tend to create barriers to mutual collaboration and shared meaning-construction, and thus to developing professional learning, especially at the organizational level (e.g. Hökkä et al. 2010).

To sum up, the negotiation of professional identity is complexly intertwined with both the workplace context and individual resources. Figure 24.1 illustrates the contextual and individual factors that are most important for influencing professional identity negotiations, and shows how the negotiation takes place at the intersection of the individual and the social. The Figure demonstrates that if we are to understand

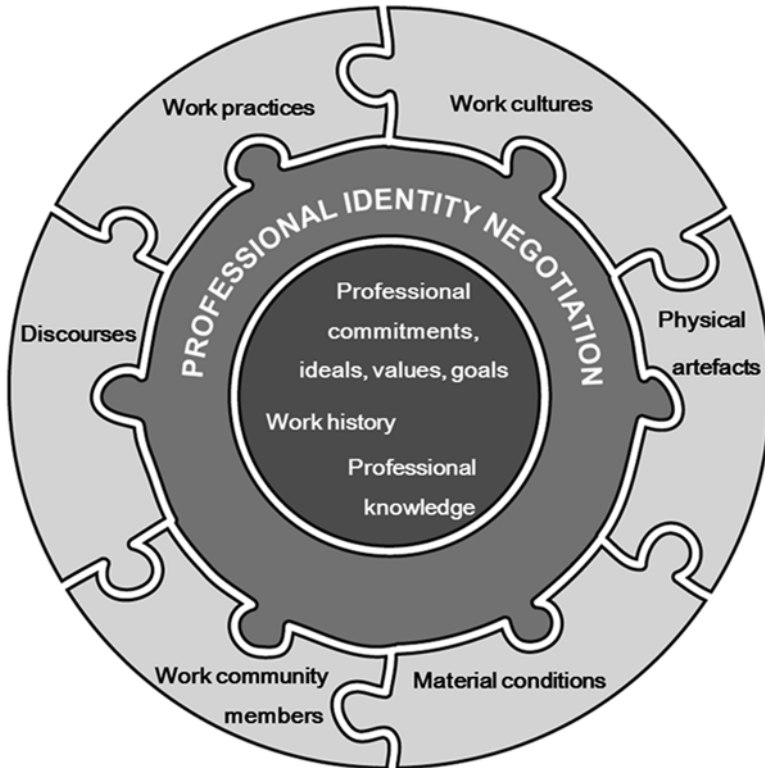


Fig. 24.1 Contextual and individual factors influencing professional identity negotiations

negotiation phenomena we must first take into account the social and organizational environments in which such negotiations are inevitably embedded. Thus, we need to recognize that negotiations concerning professional identities occur against a backdrop of a social and cultural context involving work practices, work cultures, discourses, and material conditions. The negotiations will be conducted in relation to other members of the community on the one hand, and in relation to one's individual resources on the other.

In discussing identity negotiations and the shaping of work practices, this chapter has already provided some hints and references concerning the importance of agency within these processes. However, to understand the functions of agency and its influences on professional learning, we need a wider conceptualization of agency, which is by its nature multidisciplinary and unclear in its boundaries. So far, there has not been much empirical research on the nature and manifestations of professional agency in workplace learning, or in situations where work practices are transformed. Hence, before presenting some empirical evidence on these aspects, we shall briefly consider the concept of agency and how it is used in the context of professional learning.

24.3 Professional Agency: Unclearly Demarcated, But Underlying Professional Learning

Within this section we first (Sect. 24.3.1) clarify the concept of agency and then present some empirical evidence on how agency is exercised in situations of changing work practices (Sect. 24.3.2). Thereafter (Sect. 24.3.3) we present evidence for our argument that in the workplace context, agency should be analysed not merely as an individual, but also as a collective phenomenon, capable of being manifested at work organization and work community levels, and as resourced and constrained by the dominant discourses of the organization. Since agency is in many ways connected to power (its issues and practices), we also discuss how different aspects of power may be intertwined with the exercise of agency (Sect. 24.3.4).

24.3.1 The Concept of Agency and How It Is Used in Learning Research

The concept of agency has a multidisciplinary background, having its roots in the social sciences (Archer 2003; Emirbayer and Mische 1998; Giddens 1984). In addition, the term has recently also been used in anthropology (Holland et al. 2003), psychology (Bandura 2006), and gender research (Clegg 2006; McNay 2004). Within educational practice, the concept of agency has long been established, even if it has not always been explicitly stated in connection with the development of educational and learning practices. Ever since the Enlightenment, the idea that education can and should help people to develop their capacities for agentic and autonomous action has formed an important tradition in Western societies (e.g. Ecclestone 2007). In recent decades, the importance of agency has been emphasized in theories of adult learning (e.g. Mezirov 1981). Freire (1970) discussed collective agency extensively, looking at it in terms of social (em)powerment through community-based improvements in human living conditions.

In theories of learning, the learner's active and agentic role in the construction of knowledge has been at the forefront of constructivist theories of learning (Packer and Goicoechea 2000). Individuals practise agency while they construct knowledge, and they use metacognitive and reflective processes that operate via self-control and self-management in their learning and problem-solving (Prawat 1996). In recent socio-cultural theories of learning and development, learning has further been seen not merely as the individual's active construction and generation of knowledge, but also as social participation involving the construction of identities in socio-culturally determined knowledge communities (Lave and Wenger 1991; Sfard 1998; Wenger 1998). Over the last decade, the concept of agency has gained even more currency in the education and learning sciences (Billett 2008; Ecclestone 2007; Edwards 2005; Lipponen and Kumpulainen 2011), and especially within discussions on workplace learning (Billett 2006a; Billett et al 2008; Fenwick 2006; Hökkä et al. 2012; Paloniemi et al. 2012; Vähäsantanen and Eteläpelto 2009, 2011). Within the domain

of workplace learning the concept of agency has been applied to professional work, in particular work done in creative and human-centred domains such as teaching and the arts (Hämäläinen and Vähäsantanen 2011; Hökkä et al. 2010). Recently, within discussions of adult and life-long learning, individual agency has received increasing emphasis, with learning seen as taking place through work (Biesta and Tedder 2007; Billett 2006b; Evans 2007; Paloniemi and Collin 2010; Tynjälä 2008).

Agency in general, and professional agency in particular, has very positive connotations for innovation and creativity (Glăveanu 2010; Littleton and Miell 2004; Sawyer 2007), and further for motivation, well-being, and even happiness (Welzel and Inglehart 2010). Agency is also seen as connected to subjects' autonomy and self-fulfilment, acting as a force for change and for resistance to structural power (Casey 2006; Fenwick and Somerville 2006). Indeed, in its most active and positive forms, manifestations of professional agency can be seen as subjects' creative initiatives for developing existing work practices (Littleton et al. 2012; Paloniemi and Collin 2012; Sawyer 2012). However, professional agency can also manifest itself in apparently less progressive and positive ways, such as taking a critical stance, or entering into a struggle against reforms suggested from outside (Fenwick 2006; Vähäsantanen and Billett 2008; Vähäsantanen and Eteläpelto 2009). Furthermore, professional agency can manifest itself as individual-level action or else as practised within and emerging from a collective enterprise; hence it can involve participation and collaboration within the work community (Collin et al. 2010; Paloniemi et al. 2012; Eteläpelto and Lahti 2008) or within the entire work organization (Hökkä et al. 2012; Sawyer 2007; see also Eteläpelto et al. 2013).

Within workplaces, people need professional agency in the construction of their professional identities and in the development of their work practices. We understand professional agency as being exercised in particular when professional subjects and/or communities exert influence, make choices, and take stances on their work and/or professional identities (Eteläpelto et al. 2013). Such an understanding is consonant with the theorizing of agency within post-structural and socio-cultural traditions, and more specifically within approaches that do not neglect subjects' individual identities. Furthermore, individual identities can be seen as analytically separate (Archer 2001), but mutually constitutive and closely interdependent (e.g. Billett 2006b) with the socio-cultural and material context of the workplace. Agency can be manifested, for example, as suggestions for new or more productive work practices, inter-professional work strategies, or the reshaping of one's own work roles and identities (see Fig. 24.2).

Since workplace learning (with its related agentic processes) takes place in the context of a transformation of work practices, it is necessary to ask what kind of agency is exercised in connection with such transformations. So far, there have only been a few empirical studies on the nature and manifestations of professional agency in such transformations. The following sub-section will take up the role of professional agency for transforming work practices and professional identities, especially in boundary-crossing situations. At the present time, boundary-crossing across organizational and professional boundaries occurs fairly frequently in many fields in which workplace practices are transformed. Health care and education provide examples of the phenomenon.

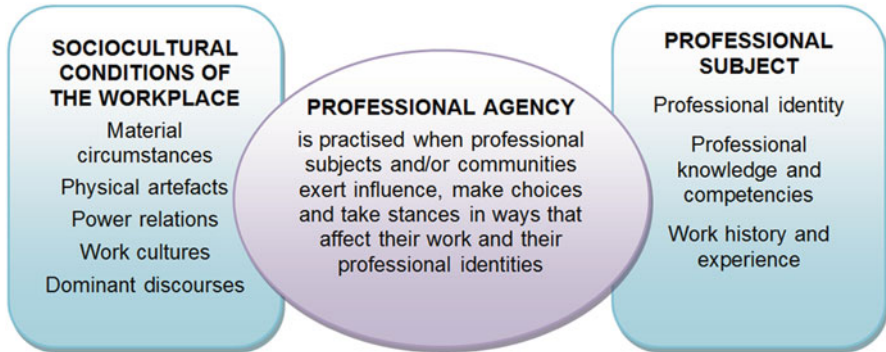


Fig. 24.2 An understanding of professional agency as related to sociocultural conditions and the professional subject

24.3.2 The Exercise of Professional Agency Amid Transformations in Work Practices

Vähäsantanen et al. (2009) found that when vocational teachers were obliged to cross traditional professional boundaries, moving beyond the schooling organization to outside workplaces, they demonstrated agency in a variety of strategies of working and acting. Five different forms of agency were identified: (i) restricted agency, (ii) extensive agency, (iii) multifaceted balancing agency, (iv) situationally diverse agency, and (v) relationally emergent agency. The teachers' activities varied from actively working, questioning other professionals' traditional ways of working, and initiating suggestions for the improvement of work practices, to being passive and uncritical actors in collaboration with other professionals. All this shows that the exercise of agency can vary over time and situations, and that agency can be exercised more vigorously by some individuals than others (see also Archer 2003; Billett 2006b; Lipponen and Kumpulainen 2011). The variation in the exercise of agency appeared to be linked especially to the teachers' sense of their professional identities, to their professional competencies, and to their relations with other professionals.

Depending on its nature and direction, the practice of different kinds of agency appeared to create diverse conditions for teachers' productive work in boundary-crossing settings, for developing education, and for remaking the work practices of workplaces (Vähäsantanen et al. 2009). One important basis for transforming social practices was seen to be created when teachers questioned the ways of working of other employees and suggested new ones. Here, it should be noted that within the socio-cultural framework it has been suggested that a prerequisite for developing new cultural tools and transforming social practices is the critical questioning of given norms and positions, and of assumptions that are usually taken for granted; in this way a focus on deviations from familiar ways of working can bring about change (Fenwick 2006; Lipponen and Kumpulainen 2011).

In contrast with the teachers referred to above, observations made on vocational teachers by Vähäsantanen et al. (2009) showed that not all the vocational teachers exercised agency in a way that would make a difference to existing workplace practices or to pre-existing professional relationships and boundaries. This was evidenced by some teachers who worked quite uncritically and humbly in boundary-crossing situations. The overall findings of the study, which focused on vocational teachers' agency in boundary-crossing situations, emphasized the importance of the nature and strength of professional agency for the remaking of social practices within workplaces, and for the extent to which social practices were transformed and developed (see also Billett 2011; Hodkinson et al. 2008).

As mentioned previously in this chapter, the transformation of work practices has, in recent years, frequently emerged from the introduction of new public management procedures, leading to tighter accountability and decreased professional autonomy for individual workers. These procedures have often been connected with organizational reforms implemented in top-down ways, with little or no consultation at shop-floor level concerning the need for changes in work practices, or suggestions as to how these might be implemented. However, such reforms clearly do transform work practices and the nature of employees' work, requiring employees to change their work identities. So far, there has not been very much research on how professional identities are renegotiated in such situations, and especially on how employees adapt to the transformations in the long term. Since most studies remain cross-sectional, they are unable to give a comprehensive picture of the longitudinal pathways marked out in the context of reforms.

Despite this, there is evidence that in relation to reforms and the transformation of practices there are always a variety of responses towards reforms. A study on senior clinicians facing organizational change found three types of response among doctors: (i) adaptation to the change and moves into hybrid roles as clinical managers, (ii) resistance to the altering of professional identity and a continuation of existing medical professional work, and (iii) resistance to the enterprise discourse within the public sector, but adoption of it in private sector work (Doolin 2002). Similarly, it has been suggested that in the reform context teachers' professional agency can be manifested not only in proactive actions and the adoption of new roles, but also in criticism and well-justified resistance (e.g. Pyhältö et al. 2012; Vähäsantanen and Eteläpelto 2009). These different responses towards the work illustrate personal differences in the exercise of agency.

Similar differences were found in a longitudinal study covering a period of 1–1,5 year, focusing on vocational teachers' practice of agency in the context of an educational reform. The study was conducted at a time when a major educational reform was being implemented in a vocational school (Vähäsantanen and Eteläpelto 2011). It was found that when the teachers experienced the positive consequences of the reform, they maintained and strengthened their professional identities (see also Woods and Jeffrey 2002). By contrast, in situations in which the teachers found themselves in conflict with the goals of the reform, some teachers were ready to renegotiate and change their existing professional identities to correspond with the social expectations associated with the reform. There were, nevertheless, some

teachers who refused to adjust their professional identity when that identity conflicted with social suggestions. Overall, in transforming or maintaining their identities, the teachers' experiences and emotions were strongly related to the influences of the reform on their work and on the social resources available to them (Vähäsantanen and Eteläpelto 2011; see also Day and Kington 2008; van Veen and Slegers 2009).

It thus appears that changes in the social suggestions of workplaces (as embodied in organizational reforms and in the resulting transformations in work practices) can drive subjects to exercise agency by negotiating their identities, but may also be insufficient to produce identity transformations, in the absence of subjects' positive experiences and emotions over time (see also Hoekstra et al. 2009). It can therefore be said that changes such as organizational reforms and transformations in work practices do not *per se* necessitate the renegotiation of teachers' identities. Nevertheless, it also appears that professional identities can be expected to undergo reshaping more readily when educational reforms transform educational practices and teachers' work (e.g. Day 2002; Hökkä and Vähäsantanen 2013; van Veen and Slegers 2009).

It is also apparent that despite the possibilities for identity-change mentioned above, the process of changing one's identity can be a challenging and long-term matter. Korthagen (2004) argues that teachers' behaviour is readily changeable, but that their identity and mission are more resistant to change. Social suggestions alone are not enough to change teachers' identities in the absence of individuals' active efforts, including activities whose aims can range from maintenance to reshaping (Vähäsantanen 2013). All of the above once again emphasizes the need for professional agency in professional identity negotiations (see also Beijaard et al. 2004; Lasky 2005). The exercise of agency seems to be necessary for the renegotiation or maintenance of work identities, and this is especially challenging when organizational reforms are implemented in a top-down manner. Agency is also needed, for example, for taking creative initiatives, crossing professional boundaries, and transforming work practices at shop-floor level.

In the studies referred to above, the practice of agency was addressed mostly at the individual level. The following sub-section will examine how agency is practised and constrained/resourced at the organizational level, and the ways in which it is related to organizational discourses and practices.

24.3.3 Agency as a Multilevel Phenomenon Manifested in Organizational Discourses and Practices

It has been suggested that a discursive approach can make it possible to identify certain hidden, culturally embedded, and historically evolved patterns of talk that position individuals and hinder organizational change (e.g. Lewis et al. 2007). The discursive approach may thus provide one way to understand contextual factors in relation to social structures, and to grasp how these enable and restrict individual and social learning (Hökkä 2012). It has been widely observed that transformations

in work organizational practices are hard to achieve (Gallucci 2008; Korthagen et al. 2006), with the combination of prevailing discourses, stable subject positions, and strong individual agency creating obstacles to community learning and organizational change (Hökkä 2012). Prevailing patterns of talk seem to be deep-rooted and also seem to position individual professionals within rigid subject positions (Paloniemi et al. 2012). From the discursive perspective, one source of agentic constraints and resources can be found in the hegemonic discourses that exist within organizations and in the subject positions they create (Hökkä et al. 2010).

In the domain of education, Hökkä (2012) showed that educators' strong individual agency in the domain of their core work (i.e. teaching) created a dilemma in organizational development: the educators' strong agency in teacher identity negotiations seemed to create powerful obstacles to collaboration and boundary-crossing between groups, and thus to organizational learning. One can see the conflicting elements here: strong individual agency can be used to protect individual ways of working, but this in turn hinders collaboration between individual professionals and professional communities, and can thus impede organizational development. Hökkä (2012) concludes that to enhance both individual professional learning and organizational change, a new kind of agency – more collective in nature – will be needed.

In addition to being a multilevel phenomenon, professional agency at work should be understood and analysed, not as an abstract phenomenon, but rather as specified in terms of its concrete professional functions, objects, and purposes. This is necessary in so far as professional agency can have very different kinds of manifestations and degrees of intensity in the different aspects of a person's professional work. For example, Hökkä et al. (2012) found that teacher educators' individual agency was very strong in the construction of teacher- and developer-identity (both at the individual and work-community levels). By contrast, the construction of researcher-identity was subjugated and weak at all levels analysed. In the area of researcher identity, teacher educators' agency was weak, and this was combined with minor resources for researcher identity construction or for working as a researcher. Moreover, teaching and researching were mainly seen as two separate functions in teacher education identities, although they are expected to support each other according to notions of evidence-based/ research-based teaching – a finding which, incidentally, is totally at variance with the prevailing goal of Finnish teacher education as a research-based enterprise (Hökkä et al. 2012). More generally, what such findings do underline is the need to address professional agency as a multi-level yet content-specific phenomenon.

As a practical conclusion, this multi-level yet context-specific phenomenon implies that if we wish to increase professional learning through promoting agency, agency should be promoted at multiple levels, i.e. at the level of individual identity construction, but also at the levels of the work organization and the work community. Many studies have emphasized the importance of individual-level agency in working life, and especially in reform contexts (e.g. Billett and Pavlova 2005; Vähäsantanen and Billett 2008). However, there is insufficient understanding of the kind of intervention programs that would function at multiple levels of local practices (e.g. Hökkä and Vähäsantanen 2013; Kalliola and Mahlakaarto 2011).

In transforming work practices, issues of power relations often become visible and are questioned. Issues of power relations (both official and unofficial) also emerge frequently as an explanation when employees are asked about obstacles to creativity or innovation (Eteläpelto and Lahti 2008; Sawyer 2007, 2012). Consequently, the following sub-section will address power relations and how these are related to the practice of individual and collective agency in workplace contexts.

24.3.4 Power Relations and the Exercise of Agency

In theoretical discussions of agency, agency is often linked to the concept of power, seen as comprising both official and unofficial power relations. In an early definition of agency suggested by Giddens (1984), the practice of agency was seen as the use of power in a positive sense, meaning the subject's power to evoke something (i.e. power *to*). In another sense, power can refer to sovereignty (i.e. power *over*) manifested for example in hierarchical or status-based power, which can abrogate to itself the right to make decisions and give one-way orders to others (such as subordinates) (Wrong 1980). Within workplaces, employees are usually fairly well aware of the official power relations. By contrast, unofficial power is often invisible and embedded in the discursive relations and subject positions created by hegemonic discourses. However, both of these forms of power have a huge influence on how agency is practised and how it is constrained in the workplace.

The concept of disciplinary power (Foucault 1980) has been found useful in studies focusing on learning in hierarchical organizations such as hospital settings (Collin et al. 2011) and in analysing the various processes of social interaction in health care practice (Henderson 1994). Disciplinary power is manifested anonymously, through diversified institutional practices which regulate and shape the actions of individual agents (Gordon 2006). Disciplinary power does not result from the exercise of sovereign power. Instead, it grows gradually, through negotiation by and between multiple institutional agents, and is mediated by discursive practices (Clegg 1998; Gordon 2006; Sebrant 2008). Disciplinary power becomes institutionalized through discursive practices involving both verbal uses of language and meaningful actions. Disciplinary power does not appear in a personalized form (unlike sovereign power); instead, individual actors may internalize it within their socialization processes. This internalization connects it also to learning, when learning is regarded as a social practice in which cultural meanings and collective membership become adopted (Vince 2001).

Power relations can be seen as constructed during the social negotiations of meanings, and they can also be situationally contested (O'Doherty and Willmott 2000). However, there also exist certain symbolic ideas, involving moral or other collective standards, which are used to authorize the exercise of power (cf. Mills 1990 [1959]). Collin et al. (2011) conclude that power relations are not completely contingent or situational, and that they do not exist independently of any social or cultural context. Similar discussions of power and agency have also taken place in relation to the notion of creativity at work.

Examinations of the interrelatedness of power, agency, and creative collaboration have raised questions about the relationships involved in individual creativity, collective creativity, and action (Billett 2004; Collin et al. 2010; Paloniemi and Collin 2012). Even though single decisions made within an organization may appear to be individual acts, collective support from others involved in the work is required for the making of the decision. Consequently, collective creativity is affected by and embedded in the discursive power structures that are present in work practices. This leads to an interesting notion: a powerful individual needs to make the first move if the end result is to be a collectively shared and agreed creative action. This demonstrates the multifaceted interrelatedness of power, creativity, and agency in work organizations. In a hospital context, where a variety of power relations are present, collective acts are closely related to the exercise of agency, with individuals working together to renegotiate dominant power positions within the hospital hierarchy. Although the prevailing hierarchical power structures can constrain the exercise of creativity in the inter-professional work community of the hospital (Coombs and Dillon 2002; Nembhard and Edmondson 2006; Ramanujam and Rousseau 2006), the various forms of discursive power relations embedded in work practices at the same time create new opportunities for collective creativity (Collin et al. 2011; Lingard et al. 2004; Paloniemi and Collin 2012; Vince 2001). In fact, even though this happens mostly within professional groups rather than across professional boundaries, the findings suggest that power relations do not function merely to restrict collective creativity. On the contrary, they can also promote creative cooperation and agency in the work community (O'Doherty and Willmott 2000).

To summarize, in the studies referred to above, agency is seen as constrained and resourced by both discursive and sovereign power. This implies that agency should be analysed as a multilevel phenomenon, intertwined with different forms of power.

24.4 Concluding Remarks on Identity Negotiations and the Exercise of Agency as Necessary Processes for Professional Learning

This chapter has presented some of the ways in which the negotiation of professional identities and the practice of professional agency are of importance for professional learning. Nevertheless, we are currently only beginning to understand the multiple functions of these phenomena for professional learning. Although we now have some empirical evidence for how professional identities and agency are related to workplace learning, much remains to be discovered. In particular we lack developmental studies on practice-based interventions (operating at multiple levels) which would focus on the intertwining relationships between identity renegotiations and the practice of agency.

Professional identities are negotiated in complex processes operating between work practices and work settings, and conjoined with personal objectives, commitments, orientations, and values. Furthermore, the relationship between the personal

and the social aspects of professional identity negotiation is reciprocal: professional identity renegotiations influence transformations of work practices, and transformations in work practices (practices embedded in the socio-cultural and material contexts of the workplace) push individuals to renegotiate their work identities. It has further been shown that professional identity negotiations and the transformation of working practices require individuals to exercise professional agency.

Since the negotiation of professional identities is closely intertwined with the socio-cultural and material conditions of the workplace, this would imply that one should investigate professional identities from the perspective of how they are constructed and negotiated within workplaces and work organizations. The present chapter has referred to studies that shed light on the critical resources and constraints bound up with the socio-cultural and material conditions of workplace, and the influence these have on identity negotiations and the exercise of agency. Such critical aspects may involve material circumstances, such as spaces and places for negotiation, physical artefacts (including technical tools for communication), formal and informal power relations, work cultures, hegemonic discourses, and the subject positions created by these.

This chapter has also argued that the implementation of real changes requires the practice of agency at different levels. All in all, the studies referred to underline the multifaceted nature of agency: differing degrees of professional agency have been found to be linked to the ways in which organizational and educational changes occur, and to the ways in which individual professionals perceive the nature and extent of the changes. An analysis of the various constraints and resources has shown how, for example, certain managerial structures, hegemonic discourses, and power relations can support the practice of professional agency at individual, work community, and organizational levels. Conversely, these same contextual aspects may act as obstacles for learning and for reforming work organizations.

The findings mentioned here have further implications for understanding and investigating professional agency. They suggest in the first place that agency should not be understood as a general or abstract phenomenon, but rather in relation to concrete aspects of professional identities and duties. Such an approach is necessary, taking into account the observations that within the same profession (such as that of a teacher) professional agency can be very strong in some aspects of professional tasks, whereas in other areas it may remain weak. Secondly, professional agency should be analysed concurrently as both an individual and a collective phenomenon – bearing in mind here that strong individual agency does not guarantee that work practices will be transformed, or that work organizations will be developed as learning communities (i.e. entities functioning within the realm of collective agency).

From the ideas and empirical evidence presented in this chapter we emphasize the need to take measures to promote professional agency at multiple levels, addressing also the couplings between these levels. Consistent with this conclusion, Hökkä and Vähäsantanen (2013) have put forward the notion of agency-centred coupling. In suggesting this, the authors recognize the importance of couplings between individual, work community, and organizational levels, and of the need to strengthen couplings between these levels (see also Rowan 2002; Spillane et al. 2011).

However, they emphasize that it remains fundamental to recognize that it is always individual subjects (with their actions and practices) that are actually coupled. The focus in organizational management practices should, therefore, be more on people, relationships, and learning, rather than on structures or centrally determined standards (Goldspink 2007; Brennan and Mac Ruairc 2011). As a consequence, the priority should be given to communication, collaboration, and interaction between individuals. For such agency-centred couplings to be created there is a need to promote (i) collaboration between actors within different levels of the organization, (ii) agentic spaces for communication, and (iii) shared meaning construction within and beyond organizational boundaries (Hökkä and Vähäsantanen 2013).

As part of such a multilevel promotion of agency, individual professionals should be able to influence the decisions concerning their work with regard to community and organizational issues, and to negotiate the conditions and contents of their own core work. The promotion of agency, including participation in organizational decision-making, will be important in terms of the renegotiation of professional identity, and further in terms of commitment and goals at work. For these goals to be attained, professional agency must be supported, first of all, at the individual level through a variety of empowering tools and interventions (for example through identity workshops). These could help professionals to become aware of themselves and their relation to the changing social environment, and also help them to strengthen their possibilities to affect their working conditions (Hökkä and Vähäsantanen 2013; Hänninen and Eteläpelto 2008; Kalliola and Mahlakaarto 2011). Secondly, at the collective level, organizations and local communities within and beyond organizational boundaries should be supported through the promotion of social linkages, involving collaboration and boundary-crossing between different working groups. This support could be initiated, for example, through community and organizational level interventions whose aim would be to enhance the communal consciousness of official and unofficial power-relations, and of cultural practices within educational organizations (Kalliola and Nakari 2007). All in all, we would argue that to enhance professional learning in work organizations it will be necessary to support practices at both the individual and the collective level; and further, that this can best be implemented when professional learning is promoted through agency-centred couplings.

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Chapter 25

Simulation Learning

Jan Breckwoldt, Hans Gruber, and Andreas Wittmann

Abstract An overview is presented of the strengths and limitations of simulation learning, with a particular focus on simulation learning in medicine and health care. We present what simulation learning is about and what the main components of simulations are. The most important theoretical approaches are reviewed which were developed in order to explain why simulation learning is effective. The most prominent best-practice examples of simulation learning applications are presented, and a short overview on research findings concerning simulation learning is given.

Keywords Simulation learning • High-fidelity full scale environment • Deliberate practice • Experience • Interprofessional education • Learning outcomes • Practice-based learning • Professional learning • Skill acquisition

25.1 Simulation Learning: Practice-Based Authentic Activity in Educational Safety

25.1.1 What Is Simulation Learning About?

Simulation learning denotes learning within a safe educational environment, in which some form of reality is simulated. Learners have to learn and act within this environment. They usually have to fulfill quite complex tasks, which often are close

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to real-life tasks. Simulation learning, thus, is a form of experiential learning that is learner-centred, integrates many facets of learning (e.g. cognitive, motivational, affective, psychomotor, social) and has a high degree of authenticity.

Many forms of simulation learning, in particular those which shall be deemed to be most typical, use computer simulations. Computer simulations feature complex systems and provide learning environments which resemble reality in a number of aspects. They are dynamic and change over time (whether the learner reacts or not), and the interplay of variables usually is complex and not completely transparent (i.e. the learner has to understand side effects). First and foremost, however, they provide educational safety and illustrative clarity. Computer simulations can model situations that in reality are too dangerous to be used for learning (e.g. aviation, surgery, nuclear reactions), which are either too large or too small to be observed (e.g. seismotectonic processes, molecular processes), or cannot easily be repeated for didactical reasons (e.g. earthquakes, traffic accidents).

In many domains, professional acting requires the handling of such situations, however. In order to prepare learners, simulations, in particular computer simulations, can help to design complex learning environments which come close to reality and feature a high degree of authenticity. Thus, they allow experiential learning, on the one hand, and the reliable and reproducible construction of adequate mental models, on the other hand. Simulation learning is a practice-based, close-to-authentic kind of learning within a learning environment which permits the design of systematic instructional efforts.

25.1.2 The Development of Different Kinds of Simulation Learning

Simulation can be used at various fidelity levels, from low to high-fidelity (Dunn 2001). Low fidelity simulations often are based on written case studies (e.g. in problem-based medical curricula), or in non-technical role plays. High-fidelity simulations (Lupien and George-Gay 2001), as the contrasting opposite of simulations, use complex scenarios, often including tremendously complex computer models (e.g. aviation, medicine) and artifacts that are close to reality (e.g. manikins in medicine or nursing; Medley and Horne 2005).

Simulation learning has been used in many professions since more than 80 years, but rapid developments were achieved with the advent of more powerful technological tools (Gaba 2004). In particular, within the domains of medicine, health care and nursing, simulation learning has considerably grown in importance. In this chapter, therefore, a focus is on simulation learning in medicine, in particular in subdomains like emergency care, in which typical professional action cannot easily be introduced in learning settings without simulations.

Many developments of simulations for learning were mainly intended either for practical purposes within particular professions, or they were mainly technology-driven. As a consequence, the educational perspective often has been neglected or,

at best, been a side product. From an educational perspective, there are many good reasons to promote simulation learning, but there is not a unique “educational theory of simulation learning”. Rather, aspects of simulation learning can be found in many different theories. We consider these multiple explanatory bases a strength of simulation learning, rather than an argument to deplore a theoretical under-development. The theoretical diversity, or even eclecticism, in the field is mirrored, however, in a similarly diverse state of the art concerning firm empirical evidence. In this chapter it is not aimed to invent, or design, a “unified theory of simulation learning and instruction”, but rather to present the diversity, and richness, of evidence. The most promising avenues, both from a practice-based and a theory-based perspective, are outlined in some detail.

Simulation learning allows learners of all kinds of professions and of all performance levels to gain knowledge, to acquire skills or to learn complex procedures in a controlled and safe environment. Simulation aims to provide close-to-authentic learning experiences to prepare learners for real future situations in particular in hazardous, even life-threatening situations without having to fear any serious consequences. In contrast to many other learning activities, simulation learning is intrinsically practice-based. It allows and challenges learners to experience authentic situations and processes, and to actively apply newly acquired practical skills and knowledge to solve problems they might face in future challenges. Simulation learning sometimes is described as a “dress rehearsal”, for instance prior to confronting medical students with real patients. Acting in a simulated safe environment allows for testing existing skills and knowledge and to make sure whether learners are ready to act in the real world.

Evidence exists that learning from simulations is efficient and effective for acquiring both technical and non-technical skills. For example, Hallikainen et al. (2009) found that learning from a full-scale simulation in anaesthesia outperformed learning from supervised teaching in the operating theatre, even when time-on-task and amount of training personnel was controlled for. Besides making easier initial experiences in a field, simulation can also serve lifelong learning by facilitating deliberate practice of experts. This usage of simulation is still rare, however; it mainly can be found in aviation and in most potentially dangerous professions.

In fact, the first applications of simulation learning and simulation training were developed in high risk industry sectors such as the military, nuclear power industry, or aviation (Gaba 2004). Although serious incidents occur extremely seldom in these areas, they can happen, as the Fukushima disaster dramatically demonstrated. When the potential harm of an incident is high, then even burdensome effort is worth to be invested in prior training. When, for instance, an airliner ditches in the open sea (which occurs very rarely), hundreds of people may die if the pilot and cabin crew are not trained to handle the situation. To enable the pilots to collect experience how to act adequately (apart from the knowledge how they should act), flight simulators provide a safe and authentic environment, allowing pilots to practice critical incidents (Hays et al. 1992). Similarly, cabin crews practice in mock fuselages to organise quick evacuations.

The potential and need of simulation learning has also been realised in health care in the last decades (Gaba et al. 2001). One reason for this trend is the fact that “abusing” real patients to train practical skills is unethical and dangerous because errors in treatment may cause serious harm. A second reason is that (similar to aviation) emergency situations are not frequently encountered, leading to a potential lack of situational experience. Consequently, simulation learning has become an essential part of medical education which allows not only for acquiring all kinds of technical skills, but also communication skills and teamwork (Leonard et al. 2004). Medical simulation learning experiences a rapid development. Many studies in the field focus on methods and effectiveness of such trainings.

In the following sections of this chapter, we thus mainly focus on simulation learning in the medical area. Analogous arguments and conclusions could be drawn from other fields, however. In Sect. 25.2, we present the main components of simulations in medicine. In Sect. 25.3, the most important theoretical approaches are reviewed which were developed to explain why simulation learning is effective. Section 25.4 comprises the most prominent best-practice examples of simulation learning applications. Each of them considers simulation learning as a kind of practice-based learning, but the foci are different. In Sect. 25.5, we present a short overview on research findings concerning simulation learning. In the conclusion (Sect. 25.6), we finally discuss in-how-far the findings and the theoretical explanations are already well-developed and how future research and practice might develop. For this reason we summarise strengths and limitations of simulation learning.

25.2 Components of Simulations in Medicine

Simulation aims at mimicking reality and thereby giving learners the feeling as if they were acting in the real world (Gaba 2004). The creation of authentic, complex learning environments can be supported by actors, devices used in daily practice, and the construction of an environment resembling real world situations. According to the tasks posed in the simulation, levels of difficulty can vary from extremely simple to extremely difficult. Simulation learning can have many different foci; it can address practical, cognitive or social skills, but often it integrates all of them, thus simulating reality (Issenberg et al. 2005). According to prespecified learning goals, simulation can take many forms (Issenberg et al. 1999).

An often-used form of simulation learning is computer assisted learning (CAL), using special software that creates a virtual world where learners have to solve a problem, sometimes by interacting with computer-generated persons. In general, the main focus of CAL is to solve cognitive tasks, but it is also used to support the acquisition of practical skills. Rogers et al. (1998) investigated the effectiveness of CAL to teach a technique how to tie surgical knots. CAL proved effective compared to a lecture in combination with a feedback seminar. To train isolated practical skills in anatomy, however, lectures using partial-task trainers were superior to CAL (Evans et al. 2010). Obviously, simulation learning is not effective per se, its usage has to be carefully planned.

Another form of simulation learning, which makes significant use of real social situations, are high-fidelity full scale environments. Such simulations provide multifaceted and extremely serious scenarios requiring a high degree of teamwork. They are often used to train social and practical skills, but also aim at the development of strategic skills, including priority setting, organising multi-parted processes, and anticipatory planning. Good examples for such stress- and anxiety-evoking simulations are professional trauma resuscitation trainings, usually performed in settings which resemble clinical reality (Perkins 2007). If during a polytraumatised patient scenario an additional cardiac arrest happens, emergency physicians have to make immediate decisions how to proceed, weighing up alternatives and prioritising specific organ survival. To train these skills within such courses, high-fidelity manikin simulators offer a wide range of features, like displaying blood pressure, heart rate, breath, heart and respiratory sounds, voice, and pupils' diameter, all with physiological responses to the trainee's interventions (Okuda and Quinones 2008).

The ultimate goal of simulation learning is facilitation of transfer to daily practice and avoidance of inaccurate behaviour in future situations. To reach this goal necessitates the provision of opportunities to learn from mistakes and to acquire "negative knowledge" (Gartmeier et al. 2008a). The process of learning from mistakes requires providing learners with extensive feedback on their performance including gaps in that performance (Ziv et al. 2005). These requirements are implemented in an essential component of simulation learning, the debriefing session, which normally takes part prompt to the simulation scenario and may be supported by video recordings. During the debriefing, learners reflect on and discuss their performance, thoughts, and feelings, weigh up alternative courses of actions and identify gaps in knowledge or practical skills. The learning results may then be used to develop concrete plans how to overcome the deficits (Rall et al. 2000).

The two key components of a debriefing session are feedback and self-reflection. To maximise the value of a debriefing session, feedback and self-reflection need to be facilitated by an instructor, who should have both expert knowledge and didactic skills (Rall et al. 2000). The instructor should encourage self-reflection through targeted and meaningful questioning, e.g. "What do you think went well in your scenario?", "What do you specifically mean by this?" or "Can you explain that to us?" (Seropian 2003, p. 1702). Asking for the reasons of decision-making provokes inspiring discussions with other learners, which frequently lead to the emergence of divergent perspectives that provoke attempts to develop alternative solutions of the experienced problem. Instructors may provide specific strategies how to resolve certain performance gaps. In many simulation settings, video recordings facilitate feedback. In this case, learners review the tapes of their sessions either individually or in small groups. The recordings aid memory to intensively discuss the individuals' performance, including decision-making processes, feelings, and observable gaps in knowledge and skills. This video-based self-observation leads to additional facilitation of the learners' reflection, thereby enhancing learning outcome (Cauraugh et al. 1999; Hill et al. 2000; Hoyt et al. 1988; Scherer et al. 2003). The preparation of debriefing sessions normally starts at the beginning of the simulation learning – the briefing. Besides clarifying the learning objectives and making learners familiar

with the learning environment and its devices, it is of prime importance that the instructor creates an atmosphere of trust and respect. There should be no fear of making mistakes or being judged by the instructor or other members of the group (Fanning and Gaba 2007). The instructor should be aware that every learner has his or her own previous life experiences and individual frames that should be considered, as these prerequisites have an impact on learners' processing and assimilation of new information (Rudolph et al. 2006).

To sum up, simulation learning allows for the acquisition of practical skills, experiential knowledge or other cognitive abilities, e.g. problem solving skills that often cannot easily be acquired in real world situations. In the last decades, several simple as well as very sophisticated simulation devices were developed to facilitate learning, especially in high-risk domains like medicine or aviation industry. An important keystone for learning success after simulation learning is effective debriefing, in which feedback is provided by an experienced instructor to facilitate learners' self-reflection.

The existing variety of components of typical simulation learning is one of the reasons, why a number of different theoretical perspectives have been used to explain why simulation learning is effective. Many of these theories have a much broader scope in different fields of learning and instruction, none of them can be considered to be a specific theory of simulation learning. An overview of the most often cited theoretical perspectives concerning simulation learning is presented in the next section.

25.3 Theoretical Explanations: Why Simulation Learning Is Effective

Simulation learning is a broad concept that describes a complex learning activity in a learning environment that is designed to resemble in many respects authentic real-life situations. Consequently, simulation learning comprises many different components, as was shown in the previous section. Accordingly, many theories of learning and instruction offer plausible explanations why particular forms of simulation learning are effective. They do not form a coherent, specific theory of simulation learning, however. Rather, theoretical accounts of simulation learning tend to be eclectic. As foreshadowed, we do not deplore this situation but consider it supports the strength of simulation learning. It might be deplored, however, that the lack of a unified theory of simulation learning is responsible for a lack of coordination of research on simulation learning. A common element of the theoretical perspectives that are sketched in this section is that the power of simulation learning comes from the practice-based approach, on the one hand, and from the large degree of authenticity and, thus, transferability, on the other hand.

Theoretical explanations of simulation learning's efficacy can be found in different approaches which focus particular aspects of learning that are inherent to the

process of simulation learning. The theories outlined in this section are: (1) adult learning principles, (2) experiential learning, (3) constructivist and situated learning theories, and (4) deliberate practice.

25.3.1 Adult Learning Principles

Simulation learning includes all elements which are mentioned as parts of appropriate adult learning. Adult learning strategies and motivations typically differ considerably from those in school education (Okuda et al. 2009). Five essential principles of effective adult learning strategies and motivation were identified by Bryan et al. (2009, p. 558):

- (1) Adults need to know why they are learning,
- (2) adults are motivated to learn by the need to solve problems,
- (3) adults' previous experience must be respected and built upon,
- (4) adults need learning approaches that match their background and diversity, and
- (5) adults need to be actively involved in the learning process.

Typical simulation learning pays attention to each of these principles. Before entering a simulation scenario, learning goals and their practical meanings are commonly illustrated by an instructor within the briefing session (first principle). During a simulation session specific problems need to be solved (second principle) and learners actively participate (fifth principle). The opportunity to vary the scenarios' complexity and difficulty makes it possible to adapt to learners' level of skills, knowledge, or individual experiences (third principle). Because simulation learning is usually performed in small groups, attention can be paid to diversity of the learners (fourth principle) by individual mentoring if necessary (Okuda et al. 2009; Ziv et al. 2000).

25.3.2 Experiential Learning

With its focus on practice during learning, simulation training meets the important characteristics of experiential learning. A much cited model of experiential learning is Kolb's (1984) notion of a learning cycle in which four recurrent stages are distinguished: (1) concrete experience, (2) reflective observation, (3) abstract conceptualisation, and (4) active experimentation. This model presents as a cycle, because in the fourth stage generalisations are created, and new hypotheses are developed to be tested in future practice. So, when entering the next relevant situation, learners reenter the first stage, according to this model. During professional work, activity usually occurs simultaneously at each of the stages. For specific work episodes, and in particular in identifying learning associated with that episode, it proved helpful to explicitly separate the stages. Kolb's model of experiential learning easily fits the learning processes in simulation learning: "The simulation experience affords

an excellent opportunity to expand on this model [of experiential learning]. Learners are thrown into a simulated concrete experience that allows them to progress through the cycle, ideally developing skills and knowledge to be applied in future simulated or actual concrete experiences. One of the most important parts of the experiential learning cycle is debriefing, a process that is often difficult to perform in the typical clinical learning experience. In a simulated environment, debriefing can be successfully accomplished.” (Okuda et al. 2009, p. 334).

In this quotation, Okuda et al. (2009) describe how well the model of experiential learning fits to simulation learning, and also explicitly stress the importance of debriefing. The quality of debriefing plays a crucial role for the efficacy of simulation learning. If the debriefing is missed, learners most likely do not significantly improve their skills (Morgan et al. 2009; Savoldelli et al. 2006). The positive effect of debriefing arises from two different causes. First, learners receive feedback on their performance including what they still have to learn. (Notably, this comes along with behaviourist theories that highlight the importance of direct feedback to gain certain levels of expertise; Bradley and Postlethwaite 2003.) Secondly, learners can engage in self-reflection on their actions and experience. During reflection on their own performance, decision-making processes may be reassessed, and learners can engage introspectively about whether alternative lines of action would have been more effective (Gartmeier et al. 2008b). The analysis of critical incidents and their triggers is also consistent with theories about learning from mistakes (Bangert-Drowns et al. 1991; Ziv et al. 2005).

25.3.3 Constructivist and Situated Learning Theories

Cognitive processes like self-reflection or introspection and meaningful feedback processing are also important elements of constructivist theories. Constructivism assumes that learners’ new experience either fits to their existing cognitive structure or produces a conflict, if it does not match expectations (Perkins 2007). For instance, when learners acquired deficient knowledge or skills, e.g. an energy-snapping posture during cardiac massage, but nevertheless believe they were doing it correctly, appropriate feedback may trigger a cognitive and behavioural conflict. There are two ways how the learner can resolve this conflict. Either the existing deficient knowledge is modified or the new experience is ignored or considered to be flawed, thereby leading to disengagement (without any positive learning effect). It is part of instructor’s responsibilities to encourage learners to reflect and assimilate the received (and unexpected) feedback in a constructive way, so that effective learning can take place.

Simulation learning is learning in a close-to-authenticity environment. It thus creates a form of “in situ” or “on site” learning, which is analogous to the ideals of situated learning theories, in particular with a focus on communities of practice (Lave and Wenger 1991). From this learning perspective, teams are trained within their everyday routine environment in which they can use their own familiar

equipment. The concept of situated learning focuses on learning through the interaction with other persons within professional teams. Actively participating in such a group is what Lave and Wenger (1991) call legitimate (peripheral) participation in a community of practice. In situated learning environments, teachers' roles are to stay in the background and instead work to facilitate learners' independence which is an important principle in simulation learning. This capacity is important because simulation learning allows learners of different levels of expertise to participate in shared activities and to take over the adequate respective roles, some being more peripheral, some being more central. The involvement in communities is a tool to ensure the emergence of feedback and reflection, as the whole community's outcome is affected by individual actions.

25.3.4 *Deliberate Practice*

Practice, in particular large amounts of practice, helps a lot to improve professional performance (Ericsson 2004). Examples from professional sport show that top-level competitors immediately suffer from performance drawbacks when they interrupt practicing. However, it is not only the quantitative amount of practice that counts, but rather it is the quality of practice. The "right" things have to be trained. Professional communities often indicate which sort of practice is required, although the persons who decide about the appropriate direction of training activities, often remain invisible (they remain "in the shadow", as Gruber et al. 2008, refer to it).

"Practicing the right things" is at the core of the theory of deliberate practice. This theory explains how expertise is acquired in complex domains (Ericsson 2004). In their studies on music expertise, Ericsson et al. (1993) demonstrated that qualitative differences in musical performance could be attributed to vast amounts of deliberate practice over extended periods of the musicians' careers. Musicians who had spent more time with deliberate practice activities showed higher instrumental achievements than their colleagues who had engaged in equal amounts of musical activities, but at a lower level of deliberately focused practice. Experts were more involved in laborious learning activities over a long period of time that only aimed at improving performance. The engagement in deliberate practice focuses explicitly on problems which the learner is not yet able to perform correctly. Deliberate practice focuses – usually with support of a trainer or skilled teacher (Degner and Gruber 2011) – on the identified lacks of current performance. It introduces a definition of adequately designed step-by-step practice units and monitors the degree of improvement. The role of teachers or trainers is extremely important as teachers function not only as domain experts, but also as teaching experts. As domain expert, the teacher provides knowledge about typical requirements of the domain; as teaching expert, the teacher functions as personated accumulation of knowledge about appropriate teaching methods for domain-specific contents and for the development of skills (Lehmann 2002). It is not the execution of deliberate practice per se that explains an increased level of performance. Rather, mediating cognitive processes and reflective analyses

are constitutive for performance enhancement, because they guide subsequent corresponding cognitive adaptations (Lehmann and Ericsson 2003). Deliberate practice thus includes (1) repetitive execution of cognitive or psychomotor skills in a special domain, combined with (2) a rigorous assessment that gives (3) an informative feedback to the learners, and leading to (4) significant improvement in skills in a safe environment (Issenberg et al. 2005; Van de Wiel et al. 2011).

Analogous to the notion of deliberate practice, simulation learning often manifests features that facilitate learning progress through transfer of knowledge (Domuracki et al. 2008) and thus contribute to the acquisition of higher levels of expertise (Wayne et al. 2005, 2006). Notably, deliberate practice may even be a prerequisite for the effectiveness of simulation learning, as has been argued in a recent meta-analysis (McGaghie et al. 2011).

The role of teachers in the design of effective deliberate practice is therefore salient. The quality of instruction plays a major role in the design of simulation learning. Skilled facilitators necessarily have to create authentic problems, to choose the adequate level of difficulty, to connect learning to prior experience and to link the debriefing session to meaningful further development.

25.3.5 Summary of Theoretical Explanations

In summary, there is a variety of theoretical arguments why simulation learning can be effective. Simulation learning addresses essential principles of adult education and thus seems to be appropriate to foster adult learning. It employs a genuine learner-centred approach and leads to learning as described in the cycle of experiential learning. Simulation learning makes extensive use of feedback and provokes learners' self-reflection (Driessen et al. 2008; Hattie and Timperley 2007). Constructivist models stress the importance of curricular immersion, which is typical for simulation learning activities. These conclusions highlight the relevance of practice-based learning, whilst also stressing the importance of adequate training of teachers and instructors. These persons-in-the-shadow are responsible to appropriately direct the learners' practice, to provide them with adequate roles in communities of practice – either peripheral roles or central roles – and thus to match simulation learning with pre-existing experience in order to facilitate learners' reflection.

The role of simulation fidelity can be seen differently from particular theoretical perspectives and, thus, is extensively discussed in the literature (Norman et al. 2012; Teteris et al. 2012). Authenticity in the eyes of the learner seems to be the most important mediating factor. Yet, it is an educational challenge for teachers and instructors to construct simulation scenarios in a manner, which meets authenticity in the eyes of learners. In standardised resuscitation courses for emergency and intensive care physicians, for instance, the main learning focus is placed on the algorithm of action rather than on specific actions. In this way, the courses are based on very simple simulators. The courses rely on the "movie in one's head" of the learners, who should connect the given problem to their real life experiences (Maran and Glavin 2003). There is little empirical evidence, however, concerning the effects of such didactical decisions. The

lack of a unified theory of simulation learning is closely related with a lack of a coherent body of empirical research on the topic. Nevertheless, the practical value of simulation learning is rarely doubted, which may result from the availability of a number of well-established best-practice examples of simulation learning applications. A sketch of the most relevant examples is presented in the next section.

25.4 Best-Practice Examples: Simulation Learning Applications

In this section we describe in some detail both typical and unusual applications of simulation learning to demonstrate its wide possible use. These examples are (1) two-dimensional CAL simulation, (2) communication training, (3) resuscitation training, (4) clinical simulation workplace, and (5) simulation as quality assurance tool.

25.4.1 Two-Dimensional CAL Simulation

Early CAL simulation attempts typically adopted two-dimensional simulation formats. The programme “Dermatology 2000” may serve as an example of an interactive two-dimensional CAL programme. It was developed for undergraduate medical education in dermatology (Roesch et al. 2003) and was for some time the most demanded programme across all domains in the Virtual University of Bavaria (Germany). It was awarded a “prize summa cum laude” at the competition “Medikinale 2000” for innovative learning environments in medicine. In Dermatology 2000, students were confronted with virtual patients suffering a large variety of skin diseases, whose appearances were illustrated through real clinical photographs. Apart from the acquisition of dermatological knowledge, students learned how to ascertain case history and how to develop diagnostic reasoning skills as well as self-control in learning. The interaction of learners was supported by the use of video-based cases which are difficult to encounter in clinical reality in a scheduled fashion. Examples used were emergencies (which need immediate treatment), or transient symptoms and signs. In general, despite some lack of authenticity two-dimensional simulations offer opportunities to interact with the scenario and produce variable outcomes after interventions. More broadly, such learning formats can be qualified as “serious games”. Sostmann et al. (2008) developed a simulation for learning in pediatrics within an undergraduate medical curriculum. In their programme, an interactive touch screen of 90 × 180 cm on a table surface was used, on which a real size child in her/his bed was displayed. The virtual pediatric patient displays typical physical signs (as a skin rash) and even moves her/his body while lying in the virtual bed. The students’ task is to diagnose the child and to initiate a treatment. For diagnosing they had to use virtual examination tools such as a stethoscope or a blood pressure cuff. They had to perceive physical signs and findings which were presented as audio

files, visual displays, or a screen of a haemodynamic monitor, similar to real life conditions. Beyond learning medical knowledge, the programme also fostered students' team work and provided opportunities for expert feedback (SIMMED n.d.).

Two-dimensional CAL simulations were considered useful to provide opportunities to collect first experiences in close-to-authentic job-related issues. They have a limited potential, however, to mimic the real world. For example, it proved difficult to simulate authentic forms of interaction, in which empathic features are displayed. Other forms of simulation learning, for example communication trainings, are more appropriate to train such aspects.

25.4.2 *Communication Training*

Teaching and learning of communication skills in a structured way may be supported by professional actors who are trained to play specific roles within a defined setting. A number of 'best-practice' examples have been developed focussing on the simulation of interpersonal relationships. Professional actors are trained to provide a highly authentic learning experience through which learners try to build an atmosphere of trust while interacting with subordinates or other professionals and through which they learn how to interact with a difficult patient.

The use of professional actors in simulations offers opportunities for delivering immediate feedback, because the actors are close-to-authentic interaction partners on the one side, but professional observers of interaction processes on the other side. They easily get used to provide extensive feedback how they felt during the encounter. In medicine, it is increasingly often requested to implement extensive training phases with actors as "simulated patients" before starting with to work with real patients. Learning with simulated patients leads to a better structured patient-physician interaction (Kiessling et al. 2010). In medicine it also frequently occurs that situations are distressing for patients, for instance informing them of 'bad news'. It is ethically appropriate that novice doctors are comprehensively prepared in these processes before they encounter and enact such distressing interaction situations with real patients. It has been argued, that simulated patients provide a more authentic feedback, if they lack backgrounds in a medical profession, because then they are not blind to the "bad habits" of the professional field ("deformation professionelle").

In medicine, a substantial body of literature exists concerning standardisation of the training of standardised patients and their effectiveness (Bokken et al. 2009; Kiessling et al. 2010; Lingemann et al. 2012; Wind et al. 2004). It is difficult to empirically substantiate the effects in terms of outcome changes at patient level. Nevertheless, it can be concluded, that simulating social encounters using professional actors is a frequently used method to train communication or negotiation skills, to learn how to build interpersonal relationships and how to acquire other skills, for instance empathic behaviour or confident body language. Besides such "soft skills",

specific practical skills can be taught using simulation manikins instead of actors. A very popular form of such trainings using simulation manikins is resuscitation training in emergency medicine.

25.4.3 Resuscitation Training

A prototypical context for simulation is the training of non-routine events with severe consequences, among which resuscitation is one of the most widely used (Wayne et al. 2008). It is important to know that basic forms of resuscitation are required from virtually everyone, not only from medical experts. In resuscitation trainings, thus, the level of expertise of learners can range from pre-school children to specialist emergency medical physicians. Very simple simulation devices are used for mass trainings, the most basic one being an inflatable cushion-like torso to perform chest compressions in combination with a self-instructing video. In one study, 35,000 children at Danish schools were trained by this strategy and they then in turn took the “simulator” home to train their parents and playmates (Isbye et al. 2007; Lorem et al. 2008). The other extreme of resuscitation training is aimed to display scenarios of very rare incidents to emergency medicine specialists utilising high-fidelity full scale simulators at substantially high costs for equipment, staff and maintenance. These systems even react to virtual physiological or pharmacological stimuli with an underlying physiological model that integrate up to 20 different substance effects (Akaïke et al. 2012). Such advanced settings are useful to train on the highest levels of expertise, i.e. for situations that are so rare that an average physician will never encounter them, before being required to respond decisively. An example is the case of malignant hyperthermia during general anesthesia, which has an incidence of 1 in 50,000 anesthetics. At present, a number of university centres operate full scale simulators; in Germany, currently about 20–30 such systems are in use. Some authors claim that practicing anesthetists should train every second year on such a simulator, but outcome relevant effects have not yet been demonstrated at the patient level.

To sum up, simulation training regarding technical skills like in resuscitation has to be adaptively based on subject-specific skill level and thus can vary from very simple to high-fidelity devices. Apart from single devices or even completely equipped rooms, simulation environments can take very different forms according to the individual purpose, as the following paragraph will illustrate in which clinical simulation workplaces are described.

25.4.4 Clinical Simulation Workplace

Recently, much energy has been invested in designing and arranging clinical simulation workplaces which allow to promote simulation learning in a large variety of complexity, including the most complex, close-to-authentic environments (Lamb 2007).

Such workplaces may be single rooms, as for example intensive care medicine workplaces, operating theatres, or emergency medical vehicles. To go beyond that, some institutions began to construct whole hospital tracts with various settings for training (Studienhospital Münster [n.d.](#)). A simulation hospital contains all relevant components like patient rooms, sanitary areas, disinfection supplies, oxygen supplies, communication and alerting technology, etc. Such environments are especially suitable for interprofessional learning, because they resemble an everyday routine context, in which (for example) medical doctors and paramedics have to interact (Hallikainen et al. [2007](#)). Simulation hospitals thus provide excellent conditions for situated interprofessional working in professional communities. Again, it is difficult to find strong evidence concerning effectiveness at the patient level, but there are clues of the effectivity (Hallikainen et al. [2007](#)). In any case, training hospitals are recognisable for students as learning centres and thus help to overcome a problem that is often reported by medical students: the feeling of being unprepared for responding to serious incidents.

Learning to effectively respond to highly unpredictable courses of action is a core activity in another form of simulation learning: the disaster management. Disaster scenarios have been used for learning and coordination of teams of leading officers from fire departments, civil protection, police and emergency medical services. During the team trainings, the divisions between different responsibilities are particularly important to be understood. The German government, for example, operates a training centre with two simulated coordination centres for the training of fire department leaders, who are involved in a disaster scenario over the course of a week. The virtual scenario is located in a “real” German district, and the available resources to manage the scenario closely resemble those which are available in reality. The scene gradually builds up, for example starting with a severe thunderstorm during an open air music festival and then involving more and more complex incidents, such as a concomitant fire in a chemical industry site, which is caused from lightning during the thunderstorm. Toxic gases are produced and are being moved by the wind towards a hospital. After every half a day of training the scenario may be interrupted to give specific input with respect to the main new problem which occurred in the scenario. In the eyes of trainees, this kind of simulation is perceived as (dramatically) authentic, although the disaster effects are not directly experienced. However, it is generally acknowledged that the operating staff would also be apart from the direct disaster effects if such an accident occurred in reality.

The examples presented in this paragraph show that there are almost no limits to mimicking reality. The most complex simulations involve such a variety of influences and effects, that it is difficult to empirically find proofs of effectiveness. Many of the simulations do not have any serious alternative, however, so that best-practice evidence is considered to be acceptable. It is evident that conclusions about effectiveness depend on the sort of simulation used for particular kinds of simulation learning. For at least some kinds of simulations learning, efforts have been made to use simulations as tools of quality control and quality assurance.

25.4.5 Simulation as Quality Assurance Tool

As shown in the previous best-practice examples, simulations are useful for multifaceted purposes. Simulations as a quality assurance tool are focussing on the assessment of the current state of individuals' skills and knowledge as well as functioning of internal organisational processes, e.g. in patient resuscitation within hospitals (Ziv et al. 2000). There is some evidence of positive aspects with regard to the assessment of skills for quality assurance (Gaba et al. 1998; Høyer et al. 2009). Simulation of scenarios allows for observing the quality of practical skills rather than testing knowledge, e.g. through oral or written tests. The concept of "practical knowledge" (or, almost synonymously used, "tacit knowledge" or "practical intelligence": Sternberg et al. 2000) thus is often used to describe the outcomes of simulation learning. Some sorts of practical knowledge or practical skills are impossible to be tested in real life, for example the management of an engine failure during a helicopter take off. Therefore, pilots have to pass "check flights" on flight simulators on regular time base. Accordingly, the most frequent forms of quality assurance through simulation are applied during the examination of trainees, for instance for graduation at the end of a curriculum. In medicine, practical examinations were designed as "Objective Structured Clinical Examinations" (OSCE) and were implemented into the curricula of many medical schools all over the world (Federation of State Medical Boards (FSMB) and National Board of Medical Examiners (NBME) n.d.; Swiss Confederation 2012). OSCEs usually make extensive use of simulated patients (Adamo 2003).

In conclusion, simulations serve well issues of quality control, certification, and re-certification because of their property to specifically tailor standardised settings to assess performance. Simulations offer a large degree of standardisation in the assessment of complex skills and practices and thus usually are perceived from examinees as being fairer than unstandardised assessments.

The use of simulations as quality assurance tool is based on the recognition of some "objective" outcomes. As mentioned above, the overall body of research evidence about simulation learning is still comparably small and inhomogenous. The complexity of simulation learning, on the one hand, and the wealth of potential theoretical explanations for the effectiveness of simulation learning, on the other side, contribute to this state. However, there is now an increasing emphasis on activities associated with establishing reliable research findings about simulation learning. An overview of that research is presented in the following section.

25.5 Research Findings

Although there still is a lack of a coherent body of research on simulation learning, single research results have been developed since long. More than 30 years ago, Dekkers and Donatti (1981) pled to integrate research studies in educational attempts

including simulations. Simulations have been used to measure the processing of complex or rarely happening processes (Dooley 2002). Simulations offer options for research by creating standardised settings for observation, i.e. laboratory like conditions. Fischer et al. (2011) analysed the effects of applying a mechanical resuscitation device (MRD) on the quality of resuscitation provided by flight attendants in a cabin simulator. The use of MRD resulted in less effective ventilation. Such an investigation could hardly be carried out under real life conditions, e.g. in a flying airplane with a real patient suffering from cardiac arrest. Apart from testing new devices, simulation permits the evaluation of new procedures and processes by different approaches to determine the most appropriate alternative.

One focus of simulation studies is the investigation of complex interactions or team development processes which are either hard to observe in the real world because of rareness or because they are critical from an ethical perspective. Hunziker et al. (2010) observed the early phase of team development processes in the context of managing unforeseen critical incidents in resuscitation. Simulations can be used to replicate such processes and to systematically vary experimental conditions. In a similar vein, simulations were used to investigate human error, like deficits in communication. Bogenstätter et al. (2009) examined the accuracy of shared information between nurses and physicians joining a medical emergency situation. Using simulated cardiac arrests, the authors demonstrated that only 18 % of the given information was inaccurate.

Skorning et al. (2012) investigated the adherence of emergency physicians to a professional telemedical support by analysing complex full scale scenarios. Physicians who performed better in managing the scenario were shown to make more use of the telemedical advice given by the dispatch centre. Marsch et al. (2004) studied the relations between physicians' non-technical skills and the outcome of simulated resuscitations. They found that teams were more successful in the simulation which showed a higher quality of leadership behaviour and a more explicit individual assignment of tasks. In these examples of studies aiming at investigating the role of non-technical skills and human errors it was preferred to collect simulation data rather than data in the daily clinical routine. The investigation of these issues would have been hardly feasible in clinical practice, as the relevant events occur uncommonly, if at all.

Simulations have also long been used to investigate teaching effects. Zausig et al. (2009) examined the effects of applying a standardised simulator-based training to teach anesthesiologists' non-technical skills. Follow-up analyses of video recordings of emergency scenarios failed to show an improvement in learners' non-technical skills. As a consequence, they concluded that the simulations have to be modified, mainly concerning the authenticity. In contrast to the study of Zausig et al. (2009), Cooper (2001) found that a leadership training within a simulated cardiac arrest scenario significantly improved clinical performance. The study of Morrison et al. (2004) revealed that a teacher training intervention within a simulation led to an increase in teaching quality as measured by an OSTE (objective structured teaching examination).

Simulations were successfully used as a research tool to evaluate variations in the retention of knowledge and skills over time (Smith et al. 2008), in the appropriate time intervals for refresher trainings (Woollard et al. 2006), and in alternative training devices to enhance retention (Spooner et al. 2007). Arriaga et al. (2013) investigated operating room teams working in a series of surgical crisis scenarios in a simulated operating room. Each team was randomly assigned to manage half the scenarios with a set of crisis checklists and the remaining scenarios from memory alone. The primary outcome measure was failure to adhere to critical processes of care. Such failure was less common during simulations when checklists were available, even when controlling for clustering within teams, the teams' institution, scenario, and learning and fatigue effects: Every team performed better when the crisis checklists were available than when they were not. This suggests that checklists for use during operating room crises have the potential to improve surgical care. Weller et al. (2011) developed an instrument to evaluate the effectiveness of teamwork trainings in healthcare by the use of simulation. A similar approach was used by Cooper et al. (2010) to develop a valid, reliable and feasible instrument to measure teamwork in medical emergencies.

To sum up, simulation allows for the creation of laboratory conditions that are close to reality, but without putting other persons at risk. Simulations can be used to systematically implement and investigate effect of relatively rare events under standardised conditions. Collecting data is much easier and especially faster than if it was being gathered in clinical practice. On the one hand, researchers do not have to work on the compliance of real patients, on the other hand, critical ethical issues in working with real patients may be avoided by using manikins. The possibility to design simulations in detail makes it possible to investigate complex dynamic processes that are impossible to be observed in the real world.

25.6 Conclusions

This chapter presented an overview of the many aspects related with simulation learning. It was concluded that a wide variety exists of simulation applications to design practice-based learning activities, but there is still a lack of an unified approach to theory-building and, as a consequence, still a lack of supporting empirical evidence. To some degree these lacks do result from the nature of simulation learning, because simulation learning focuses on complex, multifaceted forms of learning in complex and dynamic learning environments. It is often difficult to compare simulation learning outcomes with real-life learning outcomes, because the relevant professional situations are rare, dangerous, inaccessible, etc. The overview revealed that simulations may serve various purposes, ranging from skill acquisition over training of rare events to assessment, quality control, to research.

It is remarkable that supporting theoretical arguments can be found in many different approaches, each of which contributes to some degree to a rationale how to explain the effectiveness of simulation learning. The theories sketched in this

chapter include principles of adult learning, which easily can be addressed to simulation learning. Kolb's (1984) model of a cycle of experiential learning can be transferred to simulation learning, as learners pass through the steps of experiencing, reflecting, conceptualising and active experimenting. Other theoretical approaches supporting the benefit of simulation learning are learning by mistakes, behaviourist and constructivist theories referring to the importance of feedback and reflection, and the theory of situated learning, which focuses on learning through the interaction with other persons within professional teams. The theory of deliberate practice explains how expertise is acquired in complex domains. The basic mechanisms of deliberate practice, an explicit focus on training issues which are not yet mastered, and a strong direction of learning provided by significant others, are typical for simulation learning. Therefore, it can be concluded that there is a robust theoretical basis to support the use of simulation. It has to be admitted, however, that the arguments have yet to come together in an integrated theoretical model of simulation learning.

The diverse theoretical background is related with a considerable diversity of empirical evidence. In order to explore the strengths and limitations of simulation learning, this chapter presented some of the most typical and some unusual best-practice examples of the use of simulation learning. These examples were used to identify particularly reliable strengths and weaknesses of simulation learning, some of which were investigated in laboratory research. As simulation learning can aim at acquiring through practice-based learning many different kinds of experiential knowledge and simple as well as very complex skills, a wide range of simulation devices and environments is in use. Partial-task trainers like anatomical models are used to teach isolated practical skills, whereas high-fidelity full scale environments aim at the development of strategic skills, including prioritising, organising multi-parted processes, and anticipatory planning, as well as communication and teamwork skills.

The question about strong empirical evidence concerning the effects of simulation learning is not easy to answer. The available empirical evidence is not as solid as one might expect. At present, most studies report consistently high satisfaction levels of learners and significant improvements at cognitive and psychomotor levels. However, the studies often lack a rigorous methodology. For example, when self assessment of physicians is used as a measurement instrument, results are flawed by extensive data on limited self assessment abilities of physicians (Davis et al. 2006). The main point, however, is that only few studies explicitly tested the transfer into clinical practice (Camp et al. 1997; Makker et al. 1995; Pottle and Brant 2000; Sanders et al. 1994), although enhancing clinical practice and patient safety is the ultimate purpose of simulation learning in medicine (Perkins 2007).

25.6.1 Strengths of Simulation Learning

One of the main advantages of simulation learning is that no persons are harmed during the learning process. Thus, learners can fully concentrate on their own learning progress without fearing any negative consequences when making a

mistake – quite the contrary: In simulation learning, learning from mistakes is a basic premise (Ziv et al. 2005). As learning from mistakes requires explicit feedback by others, it is a key element of simulation learning's effectiveness. Evidence exists that learning from mistakes under many circumstances has a greater effect than encouraging flawless behaviour (Bangert-Drowns et al. 1991). Individuals' ability to identify the gaps in their own knowledge and skills is a prerequisite to overcome individual own deficits, thereby allowing for the development of further learning activities and learning strategies.

One of the major strengths of simulation learning is that it permits practice in the context of non-routine or even very rarely occurring events (Hunziker et al. 2010), which is necessary for many particularly critical fields in domains like medicine or aviation. Learners can gain experience how to manage incidents which statistically (almost) never occur during a single individual's working life time. Simulation learning allows that such events can be repeated arbitrarily often (Arthur et al. 1998). Because scenarios can be varied in their level of complexity and speed, many different didactical approaches can be implemented. Many simulations rely on a didactical sequence which resembles the apprenticeship model. Basic skills are taught first, followed by more and more ambitious skills and an increasing central role the learners take in professional communities (Issenberg et al. 2005). The option to slow down or even stop a simulated process can be useful for novices who require more time to learn complex and stressful tasks or to understand decision-making processes. Interrupting the simulation at certain points of interest to reflect of some particular issues is a powerful feature. The option to interrupt the simulated process, finally, helps to escape from disaster without dramatic real-life consequences (McFetrich 2006).

Reflection is at the core of many theories of practice-based learning. To enable learners to reflect about the simulation learning experience, systematic feedback plays a crucial role. One of the most important components of many simulation trainings, thus, is the debriefing session, in which learners can consider and evaluate the whole scenario. These processes provide opportunities for a detailed analysis of the individual learners' actions, decision-making, feelings, and thoughts. Identifying individual gaps in knowledge and skills can be used to modify training contents or methods to overcome these weaknesses (Cannon-Bowers and Salas 1997). For example, Marsch et al. (2005) showed that learners within a resuscitation scenario were not aware of their multiple needless interruptions of chest compressions (which substantially lower patient outcome). Extensive feedback during debriefing helped to realise the deficits and to find effective ways for improvement.

Obviously, simulation learning offers particular advantages, most prominently the possibility to make mistakes without having to fear real-life consequences, the opportunity to engage in the reflective practice of rare events, and the option to vary complexity according to the interindividual differences in learning. Naturally, simulation learning also has its own limitations.

25.6.2 *Limitations of Simulation Learning*

Despite all efforts to date, there is not yet clear evidence that simulation learning has a significant impact at the institutional level (Perkins 2007). For example, it is not yet convincingly evidenced that training of leadership ability in a simulated environment has a significant impact on business success. Neither do we have undoubted evidence that team training in health care improves patient safety or the mortality rate. Accordingly, Issenberg et al. (2005) cautioned against being overly optimistic concerning the generalisability of outcomes of simulation learning studies. Most studies addressing effects of simulation learning in medicine describe improvements in knowledge and skills, and the reported satisfaction levels are consistently high. However, many of these studies lack a rigorous methodology (Nestel et al. 2011). However, at least some conditions have been identified, under which simulation effects are more reliable, such as deliberate practice or extensive feedback (McGaghie et al. 2010, 2011).

From an economical perspective, simulation learning often is highly cost-intensive, especially if expensive technological equipment and technicians are needed to operate the scenarios. Technical maintenance in addition usually is time consuming, and instructors have to be trained how to use the equipment (Graf and Grube 2004; Grube et al. 2001). This expense is often not compensated by financial earnings, but contributes rather to non-measurable financial benefits like knowledge or an improvement in skills (McFetrich 2006). Such immaterial gains might prevent future costs which result from defective goods or medical malpractice, but such causal consequences are difficult to assess (Ziv et al. 2000).

Another critique of simulation learning is that knowing about the fact that it is “only a simulation” may influence learners’ attitudes and behaviour, e.g. not taking it sufficiently seriously. Additional effort of instructors might be necessary to enhance the learners’ motivation (Fanning and Gaba 2007). On the other hand, when learners perceive being observed, they might act in a more reflected manner, leading to superior performance compared to exposure in daily routines. There is a lack of systematic investigations of such effects, however. There is evidence that, in particular, high-fidelity full scale environments and most complex simulated scenarios are generally perceived as extremely realistic (Perkins 2007). Learners often report a high emotional and motivational involvement (Hunziker et al. 2010), so that the emotional vulnerability of learners has been reported to be a serious problem associated with simulation learning. Simulated scenarios are often perceived as exhausting and daunting, and learners report fear of being judged by the instructor or by other learners (Nilsen and Baerheim 2005; Savoldelli et al. 2005). Therefore, it is a key role of the instructor to create an atmosphere of trust and respect (Fanning and Gaba 2007).

25.6.3 *Outlook*

To finally sum up, in weighing up the pros and cons of simulation learning, it can be concluded that the advantages seem to outweigh the disadvantages. The increasing complexity of many modern professions, like medicine, provokes new challenges

for adequate practice-based learning. The use of simulation learning might gain in importance, as it provides learning environments close to reality in which students can collect experiences without fearing any negative consequences. Prior to the implementation of simulation learning, however, clear learning objectives have to be defined, which are in accordance with the curriculum. Curricular immersion probably is of considerably more importance than variations in the level of simulation fidelity. Therefore, the role of the instructor is crucial: Instructors have to be experienced in the use of technical devices, and they have to be able to provide adequate feedback to learners to facilitate self-reflection. As always, “further research is needed” to answer the complex question of effects of simulation learning on an institutional level and to decide in didactically sensible ways about appropriate support of learners during simulation learning.

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Chapter 26

Learning from Errors at Work

Christian Harteis and Johannes Bauer

Abstract The manuscript discusses the issue learning from errors at work by starting from the fallibility of daily life. Errors are unavoidable, hence, employees and enterprises have to develop a way of dealing with errors which avoids their repetition. From a theoretical viewpoint a framework for the analysis of errors is developed which acknowledges psychological theories of acting. On this basis, opportunities for learning from errors can be discussed and connected to theories on workplace learning. Then, the state of empirical research on learning from errors at work is to be discussed. Finally, the manuscript ends with unsolved challenges for empirical field research.

Keywords Errors • Learning • Experience • Error culture • Action regulation • Negative knowledge

26.1 Introduction: The Fallibility of Daily Life

‘By errors we learn’ is a commonly used truism reflecting everyday experiences that demonstrate human fallibility. Undoubtedly, everyone remembers a time when computer software shows an error prompt on the screen and speculation begins on whether the input or the software has caused this error. The estimations of the time spent on computer tasks to handle and recover errors vary from study to study: Brodbeck et al. (1993) estimate it at 10 %, while others have calculated it to be up

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to 50 % (Hofmann and Frese 2011a, b) of the total working time in companies. Panko (1998) found that up to 40 % of spreadsheets used in enterprises contain incorrect figures, which warrant repeated modifications before they are error free. Overall, errors seem ubiquitous in work contexts. Before we turn to the issue of learning from errors at work, we will be discussing a few examples of different types of errors to illustrate their scope.

Insurance companies have a long-standing tradition of investigating error cases, and well-documented areas are, for example, high-security domains such as navigation, nuclear energy and aviation. Airplane accidents are intensively discussed in the related literature, because technology, for example, the black box and voice recording, allows their ex-post analysis. One of the most popular – and also the most tragic – aircraft accidents is the crash of two Boeing 747 jets at Tenerife airport in March 1977. Due to a bomb alarm at the neighbour airport at Gran Canaria, many airplanes had to land at Tenerife airport, leading to congestion. A PanAm aircraft was parked at one end of the runway. Bad weather conditions led to heavy fog at the airport, and the air control had only voice contact with the planes arriving and departing. A KLM jet was scheduled to depart and taxied to the end of the runway. During the starting routines (i.e. systems checks), the captain of the KLM jet believed that he had received permission to take off from the control tower; he started the jet and crashed into the parked PanAm jet. As investigations revealed, this accident was the result of a crew error, wherein the captain had misunderstood the message and the rest of the crew had not intervened. This incident stands as a showcase for many well-documented traffic accidents in which individual or collective failure has ended in tragedy. However, it is not always just individual or collective failure. Another well-known accident resulted from intentional and planned behaviour: the Chernobyl accident of April 1986. An entire group of highly specialised experts started a reactor test. This experiment aimed to test whether under conditions of a complete power blackout, the reactor energy would suffice to start emergency power units. Scientists and engineers with decades of experience followed a concrete plan, wherein they switched off the security systems intentionally, fully convinced that they could control the reactor manually (Medvedev 1991). However, since interventions to a complex system like a nuclear reactor have delayed and hidden effects, the engineers realised too late that a chain reaction had occurred, and the reactor was completely out of control. Thus, errors do not only occur if individuals or teams are inattentive, they also occur despite individuals or teams using their expertise. Further examples of large-scale accidents and the role of human error in them can be found in the seminal books by Perrow (1984) and Reason (1990).

The examples discussed so far indicate that errors can lead to tragic accidents, under different individual or collective conditions. However, since Darwin developed his theory of evolutionary development, we know that deviations are inevitable preconditions for evolutionary development. Hence, errors also can result in positive outcomes. The Bavarian pretzel is, at least as myth claims, the result of a simple mix-up by a Bavarian baker who dunked the pastry into a leach instead of an acid before baking. This led to the brown colouring and specific taste of the Bavarian pretzel.

All these examples indicate the fallibility of daily (working) life. There is no doubt that errors occur each day and that everybody makes errors, under various conditions. Errors may cause adverse effects but may also lead to favourable outcomes. However, it is questionable whether we really can learn from errors (Mehl and Wehner 2010). Most people find it difficult to admit errors and frankly deal with them. Further, compared to personal life, it is more complicated in the context of work, which usually follows the paradigm of efficiency. Hence, the question of what can be learnt from the kind of errors at work under certain preconditions is receiving increasing attention in educational and psychological research. Much of today's discussion about learning from errors through investigation of the causes of errors and development of modified action strategies has its roots in human factors research, accident research and research on risk-taking behaviour conducted in the 1980s and early 1990s (e.g. Frese and Zapf 1994; Perrow 1984; Rasmussen 1987; Reason 1990; Senders and Moray 1991; for an overview, see e.g. Keith and Frese 2008; Wehner et al. 2010). From the 1990s, research also focused the role of errors in learning in schools, in teams and at workplaces (for an overview see Bauer and Harteis 2012; Bauer and Mulder 2008). Several recently published edited volumes discuss the state of research on learning from errors at the workplace and within enterprises (Bauer and Harteis 2012; Bauer et al. 2010; Hofmann and Frese 2011b; Wuttke and Seifried 2012).

The structure of this chapter follows the questions mentioned in the previous paragraph. The question 'What are the kinds of errors'? highlights the fact that errors can be very diverse and have several dimensions such as severity or attribution (individual, social, or contextual factors), and it considers the characteristics of the assumed underlying cognitive processes and their potential for learning. Hence, in the first part of the chapter, we introduce a theoretical framework for the analysis of errors that allows the distinction of typical error cases. The focus of this section is on individual, because we follow a classic and commonly used conceptualisation that defines errors in the context of individual action. Second, the questions on the conditions, processes and outcomes of learning from errors will be addressed, drawing upon insights from research on learning and instruction. In this section, we extend the scope of the discussion to team and organisational learning from errors. Third, we will elaborate on these issues by summarising the state of empirical research on learning from errors in the workplace with a special focus on recent developments. Finally, we will discuss thus far unsolved challenges and draw conclusions for further research in this area.

26.2 Theoretical Framework for the Analysis of Errors

A theoretical framework for the analysis of errors must comprise (at least) three different perspectives: (1) error definition, (2) classification of potential causes in order to be able to develop a typology of error cases and (3) a systematic description of the processes of identifying errors.

26.2.1 *Error Definition*

The typical use of the term ‘error’ refers to situations in which the outcome of an action does not meet a priori set expectations and this deviation is attributed to the actor while assuming that he or she had the required competence to meet these expectations (e.g. Senders and Moray 1991). Such an understanding implies that somebody acted deliberately, (i.e. with respect to a specific goal of action) and that the result of the action did not fit with the reference criterion that was the basis for the action planning. An error, thus, is the unintended, but principally avoidable, deviation from a standard that endangers the attainment of higher-order goals (Bauer and Harteis 2012; Frese and Zapf 1994; Hacker 1998; Hofmann and Frese 2011a; Lipshitz 1997; Oser and Spychiger 2005; Rasmussen 1987; Senders and Moray 1991; Zhao and Olivera 2006). This general definition is the basis of most research approaches investigating learning from errors at the workplace. However, further, the implications need to be made explicit to develop a useful pattern for investigating learning from errors in workplaces:

- The first crucial implication refers to the standard that should be met. The definition of an error does not make sense if there is no reference criterion against which the result of the action is to be judged.
- Second, a crucial characteristic of an error is that it is avoidable. Inevitable and fateful events are not covered by the abovementioned definition of an error. However, if an error is avoidable, then somebody can be deemed responsible for it.
- Third, an error is of relevance to subsequent actions, because it jeopardises the attainment of related goals. A failure without potential adverse consequences is not covered by the error definition provided above.

This conceptualisation of an error is consistent with the hierarchical theory of human action (e.g. Frese and Zapf 1994; Hacker 1985; Hommel and Nattkemper 2011; Miller et al. 1960; Wehner et al. 2010). This well-established approach claims that human action can be described as attempt to attain a complex set of action goals, which comprises branches of goals and sub-goals on different levels. In other words, each complex enterprise (e.g. deciding about investment in an enterprise) is a set of sub-goals (e.g. developing a strategic goal, analysing budgets, comparing credit offers, analysing the market). Hence, failure to attain a specific action goal prevents the attainment of the main goal or one or more sub-goals. Action theory allows describing rationale human action as a series of issues: the basic assumption of action theory refers to competent and goal-oriented actors. This means that actors (at least subjectively) have sufficient knowledge and capabilities and are motivated to attain the goal. Hence, errors are to be distinguished from failures caused by lack of knowledge or inappropriate capabilities and from intended violations of standards (Wehner et al. 2010). The decision for an action goal, hence, needs to follow actors’ individual needs and available opportunities, to meet the requirements of action theory, which implies rationality for human behaviour. Therefore, in addition to objective action opportunities, those available from an individual’s subjective perspective are also relevant to the definition of action goals (Billett 2006). As soon as a goal is defined,

Table 26.1 Basic assumptions of action theory

Assumptions	
(1) Efficiency	Competent, goal-oriented actor
(2) Realism	Definition of goals follows individual needs and available opportunities
(3) Organisation	Planning of actions for goal attainment
(4) Realisation	Execution of activities
(5) Evaluation	Feedback on goal achievement
(6) Consequences	Completion of action or goal modification (back to 2)

acting individuals start to plan the actions for goal attainment (i.e. a hierarchical set of sub-goals is to be developed), which then are all executed serially. After the execution of all planned activities, individuals seek feedback regarding goal achievement, which then controls whether the action is completed (if the feedback is positive) or if the action goal needs to be modified (if the feedback is negative). Table 26.1 summarises the basic assumption of action theory. Under these assumptions, human behaviour is conceived as predictable and reliable, or in other words, rationale. For the external judgement of human behaviour, individuals' knowledge and capabilities become as relevant as subjective perspective on available opportunities. Hence, attribution of an error can refer to each of these parts of action regulation.

Another characteristic of an error is that its judgement always refers to a standard or a normative criterion related to the desired goal (Heid 1999; Rasmussen 1987; Senders and Moray 1991). Hence, an error is neither a physical entity nor an objective feature of an action. The judgement of an error is by definition a result of an evaluation of goal achievement. External observation of a discrepancy between the actual realisation of a goal and the reference criterion for judging its attainment is implied. This norm dependency raises the question of the operationalisability of errors and, thus, its principle accessibility to empirical research. However, norm dependency is not an exclusive characteristic of errors; it is rather a general feature of judging the quality of human behaviour, for example, 'creativity' (Csikszentmihalyi 1996) and 'superior expert performance' (Ericsson 1996). Bauer and Mulder (2008) suggested adopting a social negotiation perspective on error judgements: they state that an action should be considered an error if (1) it is judged as a deficient deviation from an expected standard and (2) this is done by knowledgeable members of a given community (e.g. occupation, academic domain, organisation) and (3) at a specific point of time. The latter point is important because the criteria for evaluating an action as an error may change over time. This perspective allows analysis of different understandings of errors and investigations of social discourses and power relations in error judgements. These issues become relevant if a theoretical differentiation of the process of error judgements is followed.

The entire process of identifying and dealing with errors can be differentiated into an action process, which ends in a result that is evaluated and consequences, which result from the evaluation of goal achievement. The crucial question is whether learning occurs as the final outcome. The action follows certain criteria such as

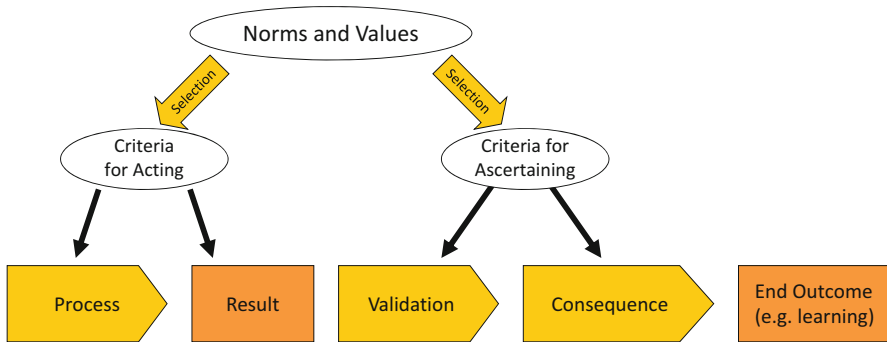


Fig. 26.1 Theoretical differentiation of error judgement

individual needs, available opportunities and a subjective selection of norms and values. These criteria are also relevant for the evaluation of action outcome. However, it is possible – and in work settings, probable – that the criteria for action do not (completely) fit with the criteria for evaluation, because actors and observers may apply different reference criteria. Usually, enterprises are organised in different hierarchies, a usual distinction being that between white and blue collar workers. A main feature of this distinction is that white collar workers evaluate the work performance of blue collar workers. This means that within enterprises, white collar workers often identify errors committed by blue collar workers. For researching learning from errors, the conditions of such an error identification system become as relevant as the way in which they are dealt with. Figure 26.1 shows the different issues of error judgement that may influence learning from errors. First, an action process follows certain action criteria and leads to an outcome. This outcome may be judged by evaluation criteria, and its consequences usually follow the regime of the evaluation criteria. For researching learning from errors at the workplace, it is important to assess whether or not the criteria for acting are the same as those for evaluation.

Generally and consistent with action theory, error judgement can be described as follows: There is an actor who conducts a process that leads to a specific result. This action follows an individual set of criteria that are influenced by subjective attitudes, knowledge and capabilities as well as a subjective selection of individual and organisational norms and values. The result, then, is the object of an evaluation, which again follows certain criteria that may also influence the individual and collective consequences drawn from the error.

To summarise this subsection, we introduced a definition of errors that is used frequently in research on human factors and derives from a classic theory about human action. We also discussed the implications of the process of evaluating actions as errors. For educational research, it is important to identify the conditions that support or hinder this entire process and result in individual and collective learning processes. Next, we will introduce a differentiation of error types as knowledge-based, rule-based, or skill-based errors (Norman 1981, 1984; Rasmussen 1987; Reason

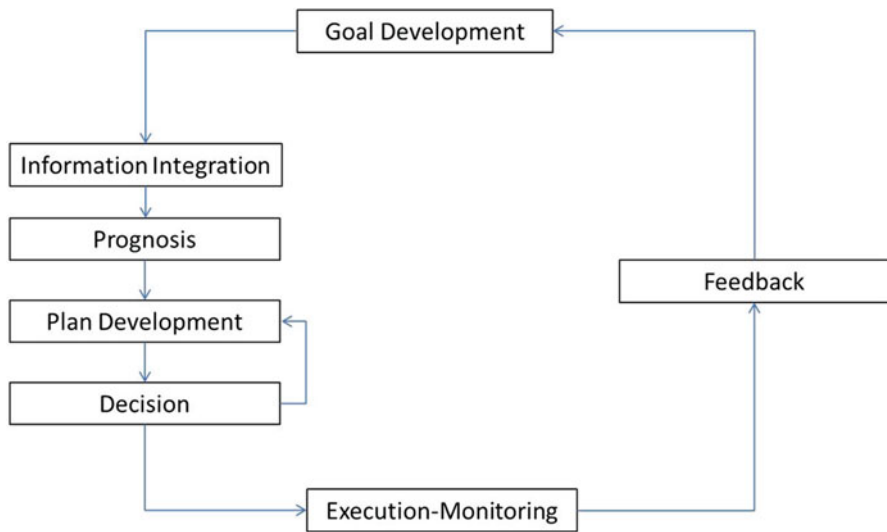


Fig. 26.2 Stages of action regulation

1990). We will only briefly discuss other types of error such as slips and lapses, caused by lack of concentration or awareness, since they probably have a low potential to result in learning.

26.2.2 *Typology of Errors 888*

To develop a typology of errors, it seems reasonable to start from the theoretical implications of action theory explained above. Figure 26.2 depicts the stages of planned actions, which will guide further explorations.

The starting point of the action process is the development of an action goal, based on individual needs and opportunities, and various mental and physical activities are initiated. After an action goal is decided on, the available relevant information has to be integrated in order to develop a feasibility prognosis. Action plans (i.e. a set of goals and sub-goals) have to be developed, eventually modified and finally implemented. This execution of actions is to be monitored, and on completion, goal achievement must be evaluated and feedback provided. The feedback may then lead to new decisions about the action goals. All these stages demand cognitive activities at various levels of knowledge. Since the understanding of errors particularly focuses on the actor's knowledge and capabilities, it appears reasonable to consider the various levels of knowledge that can be applied at these stages of action regulation. Cognitive theories provide rich insight into knowledge structures that guide action on different levels of performance (e.g. Anderson 1982; Ericsson 2006; Harteis and Billett 2013). Frese and Zapf (1994) applied cognitive theories to the

Table 26.2 Levels of action regulation

Consciousness	Level	Examples
Non-conscious – mental	Metacognitive templates and heuristics: intuition	
Conscious – mental	Intellectual regulation: knowledge based, declarative knowledge, controlled	
	Flexible action patterns: rule based, knowledge compilation, routines	
Non-conscious – physical	Sensorimotor skill level: automatic, procedural level	

Table 26.3 General taxonomy of errors

Levels of regulation	Action sequence					
	Goal development	Information integration	Prognosis	Plan development / decision	Monitoring	Feedback
<i>Heuristic</i>	Heuristic for goal orientation	Cognitive styles, rigidity, heuristics and biases, reflexion, tolerance for ambiguity		Heuristics for plan orientation	Monitoring styles	Heuristics for feedback processing
<i>Intellectual regulation</i>	Goal setting errors	Mapping errors	Prognosis errors	Thought errors	Memory errors	Judgement errors
<i>Flexible action patterns</i>	Habit errors				Omission errors	Recognition errors
<i>Sensorimotor</i>	Movement errors					

(Adopted from Hofmann and Frese 2011a)

Note. Used by permission from Routledge

action regulation concept and distinguished levels of consciousness (Table 26.2). Human action is largely steered by non-conscious physical skills that comprise, for example, the movement of the body. Other unconscious areas of action regulation include metacognitions and intuitive mental processes. Conscious areas of action regulation are flexible action patterns (routines and rules) on the one hand and deliberate application of knowledge on the other.

Merging the stages of action regulation with these levels allows the distinction of errors, which yields a general taxonomy of errors (Frese and Zapf 1994; Hofmann and Frese 2011a), as shown in Table 26.3.

This general taxonomy allows for the distinction and classification of error cases. Even though it is possible that each of these different error cases triggers different learning processes, it has not yet been clarified whether they demand different circumstances in order to allow learning from errors. Hofmann and Frese (2011a) consider this taxonomy to be reliable and valid and refer to empirical studies showing that the correction of different types of errors involves differing times and attempts,

and these differences are coherent with theoretical assumptions derived from the levels of regulation (e.g. Brodbeck et al. 1993; Zapf et al. 1992). However, Harteis et al. (2008) found large inter-individual differences in the understanding and definition of an error. Moreover, since the levels of action regulation are not directly observable, each concrete observation of a failed action applies the observer's individual assumptions about the actor's level of action regulation. Hence, error judgements seem to be highly subjective. Therefore, although general taxonomies may be helpful as analytic tools to distinguish different types of errors, they appear less helpful to analyse concrete empirical error cases as well as inter-individual patterns of reactions to errors. Mehl and Wehner (2012) provide a more general critique of error taxonomies that is partly based on the uncertainty of causal post-hoc attributions after errors.

26.2.3 *Process of Identifying Errors*

Opportunities for learning from errors depend on the way in which the error was identified and labelled. In other words, it is important to consider the process of error detection. We focus here on the conditions of this process, considering only learning from errors at the workplace; since a detailed examination of this complex process of error detection is beyond the scope of this chapter (see e.g. Hommel and Nattkemper 2011 and Yeung et al. 2004 for the neural basis of error detection).

Generally, different modalities of error detection can be differentiated by considering whether the actor himself or herself or somebody else detects the error and whether the identification of the error occurs on mediation or immediately. It might be the most fortunate case if an error is self-detected because this implies that workers understand the criteria for error judgement and that additionally they are aware of the action goals. If somebody else detects the error, the situation becomes more complicated, since the detector's and actor's viewpoints regarding the action goals and evaluation criteria may differ. In this situation, the quality of the feedback and the complex process of its interpretation and use by the recipient have to be considered. The difference between mediated and immediate error detection refers to whether error identification is displayed by indicators (e.g. instruments) or via direct observation of the failed process. Considering the theoretical differentiation of error judgement as depicted in Fig. 26.1, three challenges arise for the analysis of learning from errors:

- *Error object.* For an object to be labelled as an error, several options remain. If a damaged car leaves the production line of a car manufacturer, the damaged car itself can be labelled as an error, but the assembly step that caused the damage is also labelled an error, with similar validity. Hence, the process as well as the result of the process can be the object of an error judgement. Further, operations or artefacts can be labelled as errors. The damage itself is an artefact, and operations that lead to the damage can vary dramatically, because they can refer to workers' attitude to the task, to their routines and behavioural patterns and more. Whereas the damage itself might be identified quite clearly, it might be difficult to allocate

a concrete operation as the cause of the error. In order to learn from errors, it appears necessary to focus on processes. Moreover, the opportunities to learn from errors depend on the issue of who has identified the error. Particularly in organisations with a high level of labour distribution, it is not self-evident that the acting individual receives immediate feedback to operations conducted by him or her. It is possible that somebody else – colleagues or managers – identifies the error.

- *Criteria for acting and evaluating.* Given a competent actor, as implied in action theory, the action follows the actor's criteria and his or her norms and values. However, the crucial aspect is whether the evaluator's criteria for his judgement fit with the criteria for action. If both are similar, no problem arises. However, if the evaluation criteria are different from the action criteria, challenges to learning from errors arise, starting from issues of legitimation, acceptance and insight. If there is disagreement between an actor and observer, the situation becomes more complex, especially if one or both follow rather implicit criteria that are not precisely explained.
- *Consequences drawn from errors.* A critical factor for learning from errors is the way in which an individual or group deals with the error. The construct of error orientation (Rybowiak et al. 1999) describes individual influences on dealing with errors or the individual attitude towards errors. On the collective level, constructs like organisational climate for learning from errors (Putz et al. 2012), error management culture (van Dyck et al. 2005) or, in practitioner-oriented literature, error culture (e.g. Löber 2012; Schüttelkopf 2008) describe shared attitudes and practices of dealing with errors in an efficient and learning-oriented way. For consequences drawn from errors, the question of whether an actor's knowledge and capabilities or the intention of action is to be considered for the collective way of dealing with an error might be important, in addition to the extent to which these factors should be considered. Here, the issue of responsibility becomes relevant, which is, especially from an educational perspective, quite an awkward topic since it oscillates between ethics of conviction, domestication and emancipation.

In sum, to prepare the theoretical basis for analyses of learning from errors at the workplace, we introduced possible reference criteria for the judgement of errors, discussed a general taxonomy of errors in terms of its value in empirical studies, and explored the process of error identification to reveal general differences and incongruities that can occur in social work-related processes of detecting and dealing with errors.

26.3 Learning from Errors at the Workplace

Learning from errors at work is a specific mode of workplace learning. Tynjälä (2013) developed a framework of workplace learning that distinguishes the presage, process and product of learning considering individual factors and the sociocultural work environment. Following this framework, the concrete situational characteristics

found at a given workplace shape the outcome of learning from errors. An important question, therefore, is under what individual and environmental conditions learning from errors becomes probable. Further, reflecting on learning from errors needs to be related to the rich insight provided by research on workplace learning. Finally, several perspectives must be developed for researching learning from errors at the workplace.

26.3.1 Prerequisites for Learning from Errors at the Workplace

On the basis of the explanations in Chap. 1 (and following Oser and Spychiger's (2005) theory on learning from errors), several logical prerequisites for learning from errors can be identified (We discuss these theoretical prerequisites here, and a summary of research on what variables predict learning from errors at work will be given in Sect. 26.4.): (a) It should be clarified what exactly the error is. As discussed above, there are various options for definition of the error object. Learning needs to be related to the concrete error object in order to avoid future repetition. To return to the example of the damaged car, it makes a crucial difference if the quality of operation or the attitude to work is identified as an error because both would demand completely different activities that finally aim at learning. (b) For learning from errors, it is equally important to detect the errors and provide feedback. Even though it might appear trivial to consider the detection of errors as a prerequisite for learning, especially in large organisations, labour is widely distributed, making detection of or feedback for errors difficult. If a damaged car leaves the production belt, the defect may not be that obvious (e.g. a defective wiring harness), and the exact person or operation that caused the defect may not be clear either (e.g. inappropriate screwing work occurring several steps after installation of the wiring harness). Hence, even though an error may be detected finally, the responsible person will not necessarily realise the failure or receive feedback. The example of the wiring harness rather suggests that if the error is not detected at all at the workplace, the customer will actually use the defective product, in which case learning from errors will be almost impossible. (c) Third, learning from errors involves the development of an understanding of the error. This, in turn, implies that the causes for the error become evident. Otherwise, it will not be certain that the lessons learnt from an error will allow avoiding the same error in the future. If the reason for the defective wiring harness remains unclear, involved workers perhaps can learn various lessons from the detection of that defect, but avoidance of the error would occur only accidentally and not purposefully. Nonetheless, this deliberate error avoidance would fit with the idea of quality assurance. (d) Last but not least, to make learning from errors probable, the appropriate consequences should to be drawn from error detection. If the detection of a damaged car in the manufacturing plant leads the involved individuals to believe that it is more advantageous to hide the error, it is likely that the error or its causes remain undetected. Hence, learning from errors would be quite unlikely.

We will elaborate on this issue later in the chapter, while discussing the concept of error culture.

Facing these prerequisites of learning from errors and simultaneously considering the theoretical differentiation of error judgement or the characterisation of the process of error detection, it becomes apparent that none of these prerequisites are trivial or self-evident in the context of daily working life. As argued above, in enterprises, work usually is distributed among several individuals and in hierarchical systems, so the actors are evaluated by others. In hierarchies, individuals may not value each other sufficiently or they may not agree with another's judgement. Additionally, competition within a working group or coalition in a department make it difficult for an individual to admit an error. Hence, to support learning from errors at the workplace, it is of prior importance to foster an error culture, which is a way of dealing with errors that aids learning from errors.

Researchers of education highlight several preconditions that support the initiation of learning processes after error incidents (e.g. Harteis et al. 2008; Oser and Spychiger 2005; Seifried and Baumgartner 2009). It appears important for organisations to implement a collective error orientation (also see Sect. 26.3.2 on error culture), which interprets errors at the workplace as an opportunity for learning, because such an orientation promotes the initiation of individual and collective learning activities. It is necessary that the error really interrupts the ongoing process and that feedback be provided to the actors involved. Both these factors allow the development of concernment, an important prerequisite for learning from errors. According to Oser and Spychiger (2005), this concernment first implies that the actor involved perceives his or her own action or decision as the source of the error. If drivers skid off-road in winter because of high-speed driving, they have a good opportunity to learn from the error, if the accident is attributed to inappropriate driving. However, if the attribution of the accident is deemed external (e.g. the shape of the tires), a change in driving behaviour (i.e. learning from the error), on the part of the driver would be improbable. The second aspect of concernment refers to the emotional reaction, in which the error embarrasses the actor in a certain way. Such an emotional reaction adds value to the experience of the error situation. Given the concernment, reflective cause analysis must be conducted in order to learn about the cause of the error and alternative actions or decisions with which the error can be avoided.

26.3.2 Error Culture

Section 26.2.3 listed several approaches that model collective-level constructs describing teams' or organisations' attitudes and behaviours towards errors (e.g. Bauer and Mulder 2007a; Löber 2012; Putz et al. 2012; Schüttelkopf 2008; van Dyck et al. 2005). In fact, the term *error culture* implies that individuals in an enterprise may share norms and practices on how to deal with errors (Reichers and Schneider 1990).

The discussion on error culture is based on the premise that errors cannot completely be avoided in complex production processes or in services provided by humans (Reason 1997). Hence, dealing with errors is an important issue for business organisations. van Dyck et al. (2005, p. 1228) believe that ‘in the long run, organisations that have an effective approach to errors may be more profitable because these organisations learn from errors, are more apt to experiment and are more likely to innovate’. While the importance of learning from errors has been well-acknowledged, it has not received much attention in research literature across various disciplines. A key learning from the field of cybernetics and system theory is that relations between variables in complex settings often remain hidden. Thus, errors are unavoidable for two reasons: firstly, it is impossible to overlook and forecast all effects and side-effects of an action. Hence, perfect implementations of plans without deviations from the original intention probably do not exist. Errors are inevitable even if actors follow the best of knowledge in full consciousness. Secondly, even if deviations from intended goals and sub-goals are avoided, unintended effects in disregarded variables may occur, such as through time-delayed effects (Kühl 2002). Most literature on organisational development considers errors only in relation to error prevention (van Dyck et al. 2005). One of the goals of Total Quality Management in organisations is to attain ‘zero-errors’ through error prevention. These efforts are double-edged, because of the contradiction between detecting and understanding of errors for their elimination, on the one hand, and the perception of errors as adverse events, on the other hand. A similar approach to errors is found in the literature that focuses on the individual instead of the organisation: Individual career planning is a classic area of personnel development and an important area of human resource management. In scientific as well as popular literature on personnel and career development, errors are usually considered as threats that put one’s promotion opportunities at risk (e.g. Brown and Lent 2013).

The exploration of practices in dealing with errors, thus, leads directly into a conflict between the apparent inevitability of errors on the one hand and their adversity on the other hand. This conflict is driven by the antagonism between the ratio of productivity and the ratio of learning and development. Workplaces, as parts of enterprises, primarily cater to the provision of goods and services under economically reasonable circumstances. Such circumstances imply profitability: the sum of earnings from goods and services must exceed the sum of efforts for their provision. Performance in work contexts is often measured in profits. Given this perspective, activities that do not immediately contribute to profit appear undesirable. Errors and practices for learning from errors do not directly contribute to profit because they interrupt regular work processes. In fact, they may reduce profit. This perspective is called achievement orientation, which is possibly in conflict with a learning orientation. The latter focuses on processes of learning and development and includes activities to learn from errors. The achievement orientation, on the other hand, implied that employees’ work activities are evaluated for their performance, and it forms the basis of organisational management at all kinds of workplaces.

Learning from errors cannot be expected to occur without a supportive organisational environment that fosters a learning-driven approach to errors. This idea is

summarised in the concept of error culture. Unfortunately, this term is prone to misinterpretation in that it seems to suggest that errors are not adverse events or are even desirable in order to create learning opportunities (Peters and Peters 1987). This understanding is naturally incompatible with the goals of many domains of work, especially those that involve high risks, such as health care, aviation, or nuclear energy. Ideally, error culture should be understood as shared norms and practices that transform errors – that escaped prevention – into learning opportunities, with the ultimate goal of reducing the probability of repeating such errors (cf. Harteis et al. 2008; Reason 1990).

On the basis of these premises, Bauer and Mulder (2007b) conceptualised error culture as an integrative organisational strategy. We expand their model by articulating the strategy in the form of the following four goals:

1. To prevent errors as far as possible;
2. To deal with errors that occur in an efficient manner, that is, to correct them quickly and to curtail adverse effects stemming from them ('error management'; Reason 2005);
3. To analyse occurring errors in order to learn from them, that is, to gain insights that help prevent such errors in the future and to create knowledge or even innovations from an error situation. Such learning can occur at the individual, team, or organisational levels;
4. To create conditions within an organisation that are conducive to the attainment of the above goals.

This approach is called an integrative strategy, first, because it integrates the seemingly disparate or even contradictory goals of error prevention and learning from errors. Second, it combines the abovementioned approaches for learning from errors, error management culture and error culture within an organisational climate. Third, it addresses and integrates learning processes and their conditions both at the individual and collective level (cf. Järvinen and Poikela 2001). The latter becomes more apparent when discussing the practices through which these goals may be attained. These practices involve the following:

1. Efforts of organisational safety, risk and quality management that estimate the risk of occurrence of certain errors, measures to reduce their probability (e.g. by means of automation, standardisation of processes and design of the work environment) and creation of error tolerant systems that prevent adverse effects stemming from errors (e.g. Glendon et al. 2006; Reason 2005).
2. Efforts of organisational learning from errors by means of systematic collection and analysis of errors and critical incidents with the purpose of revising and improving current organisational structures and processes (e.g. in form of critical incident reporting systems and quality management tools; Pfeiffer and Wehner 2012; Zhao and Olivera 2006)
3. Team and individual efforts to analyse own errors, their potential causes and the development of strategies to avoid similar errors in future (Bauer and Mulder 2013; Leicher et al. 2013). Such learning will most likely occur informally at the workplace.



Fig. 26.3 Model of error culture as an integrative strategy (*Note.* Adapted from Bauer and Mulder 2007b; CIRS Critical Incident Reporting Systems)

The implementation of these three strategies depends on supportive conditions within the organisation, situational factors of the immediate work environment and individual characteristics of the employees (cf. Billett 2006; Tynjälä 2013; Zhao 2011).

Figure 26.3 represents the discussed goals, strategies and conditions of error culture. It is an integrative strategy that aims to facilitate the attainment of the goals of error prevention, error management and learning from errors. These goals can be attained by means of traditional prevention strategies as well as through combined efforts of organisational and individual learning. They form the pillars of the error culture. To what extent such learning will take place depends on the interplay of individual and contextual factors at the workplace. These variables constitute the bases of error culture, and an additional goal is to create supportive conditions.

This model of error culture not only blends with but also extends previous approaches to learning from errors. A similar model that considers organisational norms and values, competences and instruments for handling errors as pillars of error culture has been proposed by Schüttelkopf (2008). Löber (2012) recently reviewed existing approaches to conceptualise error culture.

From the discussion above, it is clear that the implementation of error culture means to establish an environment that appreciates learning from errors and, thus, accepts restrictions on work performance. Error culture, however, does not imply a neglect of work performance; rather, it represents a long-term approach for the evaluation of work performance. A learning-oriented approach to dealing with errors and learning from errors may impede work performance in the short-term but it may concurrently contribute to enhanced performance if the learning is successful.

It is essentially a matter of the time point of performance measurement if a process is to be judged as cost or benefit. Empirical evidence exists that in the long run a learning-oriented organisational approach to errors leads to higher performance (van Dyck et al. 2005).

In summary, error culture is a learning-oriented approach to dealing with errors. It encourages the organisations to view intra-firm activities not only from an achievement perspective but also from a learning perspective. In the event of an error, it must be possible to interrupt regular processes to focus and analyse the error. For an appropriate understanding of errors, it is necessary to interpret them as results of individual or collective decisions but not as an inevitable incident. Such an understanding leads to alternatives that contribute to the knowledge on how best to avoid the repetition of the same error. However, establishing such organisational practices towards errors is challenging because they require what Edmondson (1999) calls a positive learning climate, comprising, firstly and most importantly, a climate of psychological safety. Psychological safety refers to an employee's subjective perception of the possibilities to act without fear of reprisals from colleagues or supervisors (Edmondson 1999). Secondly, a positive learning climate demands emotional tolerance of the error. Negative emotions are natural reactions of failing, and it is almost certain that emotional reactions are innate with a long history of phylogenetic roots (Damasio 2010). It is important not to fight these reactions back but to allow them to surface and finally dissolve. Thirdly and finally, a positive learning climate allows room for further improvement; that is, the person who committed the error is encouraged to fix the problem at the next attempt and not to avoid the situation that led to the error.

26.3.3 Processes of Learning from Errors

Learning from errors at workplaces requires a solid foundation in the theories of workplace learning in particular and in the theories of learning in general. In this section, we aim to integrate the concept of learning from errors with established theories on workplace learning. For this purpose, we draw upon a systematic review of workplace learning theories in a recently published textbook (Dochy et al. 2011). This volume provides a collection of well-acknowledged theories on workplace learning that provide different perspectives to conceptualise learning from errors. Within the broad domain of experience-based learning, the following theories on workplace learning are particularly relevant to learning from errors.

26.3.3.1 Experiential Learning

In terms of learning theories, learning from errors is best understood as experiential learning (Gruber 2001; Kolb 1984). Concrete experiences (e.g. errors) trigger mental activities that result in the development of new knowledge or the modification of

available knowledge. Different perspectives of the experiential learning theory are relevant here. We distinguish between a cognitive and an activity perspective, which serve different but complementary purposes for conceptualising learning from errors at work. The cognitive perspective explains learning as the acquisition and improvement of knowledge and focuses on the memory and knowledge structures involved. Theories of case-based reasoning and the modification of scripts in dynamic memory (Kolodner 1983; Schank 1999) have provided models of how schematic, action-oriented knowledge structures (i.e., scripts) are extended and modified through reflecting on the experience of deviant episodes. Further, this line of inquiry explains how the experience of errors may lead to improved performance and – in the long run – cognitive flexibility through the drawing of analogies to newly encountered episodes (i.e. case-based reasoning). The activity perspective views learning as a self-organised effort to improve performance (Boshuizen et al. 2004). This perspective is useful in determining the activities that are relevant in order to learn from an error. The activity perspective is grounded in the theories of experiential learning (Gruber 2001; Kolb 1984) that view experiential learning as action-reflection-action cycles. Kolb's (1984) model describes experiential learning as iterative cycles of (i) making a concrete experience, (ii) observation and reflection, (iii) forming abstract concepts and (iv) testing the gained insights in new situations. Applied to learning from errors at work, an experiential learning cycle can be modelled to involve (a) reflection on the causes of an error, (b) the development of new or revised action strategies that aim to avoid the error in the future and (c) experimenting with or implementing the new or revised strategies (Bauer and Mulder 2007a). Each of these activities can be performed individually or in social cooperation with others at work. There is some evidence to suggest that learning activities performed during social interactions with others at work (i.e. joint analysis of causes and the development of new action strategies) are particularly relevant to learning from errors (Edmondson 1999). This appraisal is consistent with the emphasis on the role of social exchange on workplace learning (Billett 2006; Eraut 2000). Communication and exchange can foster the development of shared knowledge and understanding of errors as well as elicit solutions and strategies to handle them (Cannon and Edmondson 2001; van Dyck et al. 2005).

Under this experiential learning perspective, errors can be seen as specific incidents of concrete experiences that diverge from prior knowledge (Bauer and Gruber 2007). When an employee acts according to his or her best knowledge, an error is an incident that reveals the fallibility of the state of knowledge. There is a gap between expectations (action goal) and achievement which becomes the object of observation and reflection, in order to enable the employee to form an abstract concept on the error case (i.e. negative knowledge, theory of the error case). This step in itself constitutes learning from errors, since available knowledge is expanded and modified. However, the avoidance of error repetition requires a fourth step in this cycle: the testing of the new concept in novel situations. Kolb and Kolb (2005) empirically tested different modes of learning, all of which aim at closing the cognitive gap revealed by the experience of an error: diverging, assimilating, converging and accommodating.

26.3.3.2 Transformational Learning and the Reflective Practitioner

Though models of experiential learning are quite useful for modelling learning from errors at work, Kolb's (1984) approach, in particular, has been criticised for its lack of elaboration on reflection (Boud 2006; Järvinen and Poikela 2001; Van Woerkom 2003). Conceptualising reflection on errors therefore requires drawing upon more comprehensive theories of reflection (Bauer 2008). The concept of *transformational learning* (Mezirow 1991) focuses on individual construction of meaning that is based on reflection upon authentic practical experiences. Experiences play a two-fold role in this context: first, they shape the mental frame for the interpretation of the practice; second, the concrete experience of practice shapes the beginning of a learning process. Again, an error can be such an ignition for learning. Mezirow (1997) describes three phases of transformational learning: (i) the critical reflection of practical experience, (ii) discourse about the outcome of the critical reflection and (iii) action as the application and testing of the newly developed knowledge. The importance of reflection for (workplace) learning is also emphasised in Schön's idea of the *reflective practitioner* (Schön 1983). By analysing high performing practitioners, he recognised the importance of tacit knowledge for practical activities and developed the idea of knowing-in-action. However, sometimes actions produce surprising results (e.g. errors), which lead to reflection-on-action, in order to reveal how knowing-in-action may have guided the actor.

In synthesising the research on reflection, Boud (2006) identified several themes that are relevant to conceptualising the processes of learning from errors at work. Reflection refers to cognitive and emotional processes as well as to overt actions that serve to examine experiences. It is frequently triggered by the experience of conflict, such as surprise, perplexity, hesitation, uncertainty, dissatisfaction or discrepancy (cf. Kolb 1984). Particularly, emergent problems and unexpected outcomes may lead practitioners to leave a routinised and intuitive mode of action regulation for a deliberate, knowledge-based and analytical one (Ellström 2006; Eraut 2000; Schön 1983). Consequently, reflection can be considered a conscious, volitional process of interpreting and making sense of experiences (cf. Ellström 2006) and relates to the reactive and deliberative modes of learning discussed by Eraut (2000). Even though reflection has been regarded mainly as an individual activity, the benefits of which concern the individual, it is inherently social and contextual, as its outcomes concern action in and relations with a social and technical organisational environment. Individual reflective processes may profit from social exchange, and a collectively shared practice of reflection may initiate processes of group or organisational learning (Høyrup and Elkjaer 2006; Van Woerkom 2003). Moreover, reflection has to be analysed on an 'instrumental to critical' continuum (Mezirow 1990; Van Woerkom 2003). According to Mezirow (1990, p. 1), '[Instrumental] reflection enables us to correct distortions in our beliefs and errors in problem solving. Critical reflection involves a critique of the presuppositions on which our beliefs have been built'. Thus, instrumental reflection concerns the content and processes of problem

solving and serves learning how to act. In contrast, critical reflection has an emancipatory focus and concerns questioning the underlying and often implicit goals, values and beliefs that lead to action.

These general themes on reflection help gain a deeper understanding of how reflection on errors can be conceptualised (Bauer and Mulder 2008). In this context, reflection means performing a root-cause analysis to identify probable causes of an error (Kolb 1984; Kolodner 1983). Reflection on errors, therefore, refers to a conscious, volitional process, involving cognition, emotion or overt action that serves to examine, interpret and make sense of this experience. An actor may engage in cognitive or overt reflective activities as a response to a conflict induced by the detection of an error, with the aim of analysing its causes. Reflection on errors has a social dimension in that it may be performed collectively, and its outcomes concern action that cannot be considered as separate from the sociocultural context in which it occurs. Locating reflection on errors on the continuum between instrumental and critical reflection is more difficult. The focus of reflection on errors as discussed so far in this chapter is an instrumental one; that is, the goal of reflection is to enhance future problem solving and action. However, learning from errors is not restricted to instrumental reflection for two reasons. First, even if the goal is an instrumental one, the means of achieving this goal can incorporate critical reflection. In-depth reflection on root-causes, results and ways of prevention is necessary to achieve a change (Aspden et al. 2004; Harteis et al. 2007; Van Woerkom 2003). Secondly, errors can also initiate critical reflection, necessitating an in-depth inquiry into the underlying values and presuppositions of the practice. Therefore, learning from errors is not limited to mere adaption and can result in discontinuation of existing practices and development of innovations (Ellström 2006; van Woerkom 2012).

26.3.3.3 Deliberate Practice

The concept of *deliberate practice* (Ericsson 2006) is also relevant to learning from errors, since it primarily implies monitoring of performance and reflection on especially erroneous outcomes. Deliberate practice refers to individual efforts to improve one's knowledge, capabilities and performance by analysing and reflecting on past performance and consciously practice tasks that have not yet been mastered. Deliberate practice is crucial for the development and maintenance of expertise and requires consistent practice, specifically on aspects of activities that (still) seem erroneous (Ericsson 2009).

In conclusion, it is important to discuss the unique aspects of learning from errors as addressed in the various (workplace) learning theories. In educational or psychological research, learning from errors is viewed as a form of experiential learning. However, serious research on learning from errors needs to be grounded in learning theories. Extant literature predominantly focuses either on prerequisites, namely, frame conditions for learning from errors (e.g. error culture or error orientation) or on behavioural issues (e.g. change of practices). However, it does not

usually analyse learning processes. We still need a more thorough understanding of the processes of learning from errors and how they differ from the strategies derived from general theories on experiential learning at work.

26.3.4 *Outcomes from Learning from Errors*

The main outcome of learning from errors is the development of knowledge about the error and how to avoid its recurrence. This knowledge ultimately needs to be applied in future situations to ensure error prevention. The cognitive perspective on experiential learning explained in Sect. 26.3.3 allows for the modelling of cognitive processes and the representation of the outcomes of learning from errors (Bauer and Gruber 2007; Gruber 2001). This perspective defines learning as the acquisition and improvement of knowledge through experiencing personally relevant episodes and focuses on the memory and knowledge structures involved. In particular, theories of case-based reasoning and the modification of scripts in dynamic memory (Kolodner 1983; Schank 1999) have shown how schematic, action-oriented knowledge structures (i.e. scripts) are extended and modified through reflecting on the experience of deviant episodes, including errors. Through reflection on the causes of an error episode, an underlying script can be enriched by an additional part (i.e. an *index*) that distinguishes the deviant parts from the expected ones. The index assists the actor in remembering the deviant episode during recurrences of a similar situation and in choosing alternative action strategies (i.e. case-based reasoning). Hence, the cognitive perspective explains how the experience of errors may lead to improved performance and – in the long run – cognitive flexibility through the construction of analogies to newly encountered episodes (i.e. case-based reasoning).

The expanded or modified knowledge about the error is referred to as *negative knowledge* by some authors (Gartmeier et al. 2008; Oser and Spychiger 2005; cf. Minsky 1994). In contrast to positive knowledge, negative knowledge focuses on how things are not conditioned or not working. The knowledge differentiates between features of an object and issues beyond its features. Philosophically speaking, a comprehensive understanding of objects necessitates knowledge not only about the objects' features but also about the characteristics that are not part of the objects. Gartmeier et al. (2008) elaborated on parallels between the model of indicated scripts (Kolodner 1983) and the theory of negative knowledge (Oser and Spychiger 2005; cf. Minsky 1994). According to these authors, the term 'negative knowledge' denotes knowledge about the conditions for errors in specific action sequences (procedural aspect) as well as inadequate assumptions concerning a specific context (declarative aspect). Oser and Spychiger (2005) assume that negative knowledge is acquired through learning from errors and helps to avoid similar errors in future situations. Hence, as in Kolodner's (1983) model, knowledge about relevant errors in specific task episodes is considered helpful for avoiding errors and choosing a promising course of action.

26.3.5 Summary

In sum, this section has explored individual and environmental conditions of learning from errors at the workplace characterised by typical approaches to division of labour. The concept of error culture has been introduced to clarify social practices at workplaces that support learning from errors. Different theories on workplace learning have been discussed with a view to providing a theoretical basis for learning from errors. Finally, the concept of negative knowledge has been discussed to elaborate the outcomes of learning from errors. So far, the theoretical frameworks and distinctions for investigating learning from errors at the workplace have been introduced. The next section provides an overview of the state of empirical research.

26.4 State of Empirical Research on Learning from Errors at the Workplace

Despite the long tradition of research on errors and human fallibility in the disciplines of safety management and organisational psychology, the issue of learning from errors has only recently attracted the attention of scholars on workplace learning. The existing lines of inquiry typically adopt an organisational (learning) perspective. Studies on individual learning from errors and its contribution to individual workers' professional development as well as to team-level progress are few in number (Bauer and Mulder 2008; Bell and Kozlowski 2011). When we commenced research on this topic over 10 years ago, there were virtually no studies on learning from errors within this field. The few research works that existed were scattered over several disciplinary fields, with almost no interconnections. However, since then, the field has grown substantially, and today there are several edited volumes, special issues (Bauer and Harteis 2012; Bauer et al. 2010; Hofmann and Frese 2011b; Wuttke and Seifried 2012) and regular conference symposiums on workplace learning research. In this section, first, we summarise findings from an early review on individual learning from errors in the workplace. Second, we highlight some recent promising developments and approaches that we feel warrant further investigation. A more systematic review of the existing research is, however, beyond the scope of this chapter.

26.4.1 Research on Learning from Errors at Work: From the Early Days to 2008

Bauer and Mulder (2008) reviewed eight empirical studies on learning from workplace errors, published between 1996 and 2004. They analysed the conceptions of errors, the definition of learning from errors and the empirical approaches.

Table 26.4 Overview of variables related to learning from errors at work from a review of early empirical studies (Bauer 2008)

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1. Unsympathetic and unjust reactions; helping and protective supervisor
 2. Supervisor direction setting, coaching, supportive vs. authoritarian; unit characteristics: quality of interpersonal relationships, espoused attitudes to errors (blame vs. learning); perceived consequences of making errors
 3. Accepting responsibility vs. distancing and self-controlling strategies
 4. Problem-solving orientation (i.e. communicating, discussing and analysing errors) and cooperative goals in the team
 5. Support from the management, team psychological safety
 6. Learning-oriented beliefs about errors in the team
 7. Team psychological safety
 8. Self-efficacy, difficulty with change, management job
-

Note. (1) Arndt (1996), (2) Edmondson (1996), (3) Meurier et al. (1997), (4) Tjosvold et al. (2004), (5) Tucker and Edmondson (2003), (6) Cannon and Edmondson (2001), (7) Edmondson (1999), (8) Van Woerkom (2003)

The findings indicated that – even though the studies made important contributions to breaking new ground – the theoretical and empirical approaches differed substantially. Most of the studies did not clearly elucidate the concept of error and the type(s) of error under investigation. Moreover, though many relied on some form of experiential learning theory for conceptualising learning from errors, the empirical methods for investigating it were too diverse to allow an integration of the findings. These problems notwithstanding, the reviewed studies still addressed a range of approaches to learning from errors at work. Moreover, the independent variables used in these studies (cf. Table 26.4) offer interesting avenues for further theorising and research.

The studies reviewed directly addressed learning from errors at the workplace. Some of our own earlier works took a slightly different approach by investigating how errors are actually dealt with in daily work (Harteis et al. 2007, 2008). One of the most noteworthy findings was that employees from different types of organisations consistently highlighted the importance of socially-shared learning activities to analyse potential causes of errors and to develop action strategies that reduce the probability of their reoccurrence. This finding is interesting as much of the earlier research had neglected the social dimension of reflection, as discussed in Sect. 26.3.3. It seems that learning from errors is – both theoretically and in practice – an activity that depends substantially on social exchange.

26.4.2 Recent Developments

During the last 5 years, research on learning from errors in the workplace has increased substantially. Fortunately, a shift in quality is also evident. That is, more well-defined theoretical frameworks and sophisticated empirical models are being

used, and authors are increasingly aware of relevant studies from outside their own disciplinary field. Below, some recent studies that are conceptually and empirically noteworthy are discussed, because they investigate outcomes of learning from errors, use strong designs or measurement methods, replicate and generalise findings across studies, or test the effects of interventions in (quasi-)experimental designs.

Investigating outcomes of learning from errors. Because learning from errors at work occurs incidentally, it is bound to the specific error situation and its context. Therefore, it is quite difficult to define and assess an outcome measure that could show its effects on an individual's professional knowledge. To our knowledge, a series of studies by Gartmeier and colleagues (Gartmeier et al. 2010a, b, c) is the only empirical work that measured outcomes of learning from errors at work. By using knowledge elicitation techniques, the authors identified different types of negative knowledge held by elder care nurses and showed that – as expected – the quality of this knowledge varies in line with the nurses' degree of expertise (Gartmeier et al. 2010c). These studies are particularly innovative as they provide a pathway for further research on how learning from errors affects the level of knowledge.

Strong designs and measurement methods. The studies described so far in this chapter used either interviews or questionnaires as measurement instruments and relied on cross-sectional designs. These methods have inherent weaknesses in terms of validity and conclusiveness. Recently, some notable exceptions have been published in the context of vocational education that demonstrate how stronger designs and measurement methods can be applied to the investigation of learning from errors. Türling et al. (2012) developed a test instrument that measures (pre-service) teachers' knowledge of typical student errors in the domain of bookkeeping as part of their 'professional error competence'. This test employs both reactions to video vignettes and paper-pencil questions. Even though this approach does not focus directly on learning from errors at work, the idea of developing test situations that allow the investigation of participant responses to (own or others') errors is highly relevant. In a longitudinal study, Rausch (2011) studied industrial clerk apprentices to investigate error occurrence at work, learning and motivational and emotional aspects. Data were collected through questionnaires with an internet-based work diary that participants completed over a period of ten workdays. The diary descriptions enabled the authors to draw a particularly detailed picture of learning from errors at work and its conditions. The findings show, for example, a strong correlation ($r = .6$) between the average reporting of errors and the average perception of learning from work tasks.

Replicating and generalising across studies. Given that learning from errors at work is an emerging field of study, few attempts have been made to replicate findings or to synthesise and generalise across studies. A notable exception is the study by Leicher et al. (2013). Their goal was to investigate whether exploratory findings from an earlier study on hospital nurses' engagement in social learning activities (ESLA) (Bauer and Mulder 2013) could be replicated and generalised to the field of elder care nursing. For this purpose, a sample of $N = 180$ elder care nurses was surveyed using a vignette-based questionnaire. The study investigated a mediation

model of nurses' ESLA used in the earlier study. The model assumes, first, that negative feelings related to an error situation have an indirect effect on ESLA that is mediated by the estimation of an error as relevant for learning. Second, the perception of a safe social team climate at work has also an indirect effect on ESLA that is mediated by nurses' motivational tendency to cover up errors. These results entirely cross-validated the exploratory findings of Bauer and Mulder (2013) on hospital nurses' ESLA and showed that they could be generalised to the domain of elder care nursing. These results are consistent with current approaches that consider error reporting as dependent on a subjective cost-benefit balance (fear of repercussions vs. benefit from learning; Zhao 2011). They also corroborate the finding that there are two levels of discrete predictors for ESLA: one that pertains to the individual reaction and appraisal of the error situation (emotional strain, relevance for learning) and the other that concerns the social context and the anticipated reaction of reporting an error (team climate, covering up errors). A recent qualitative interview study by Seifried and Höpfer (2013) provides further support for the validity of the mediation model within the chemical industry setting. Together, these studies provide strong examples of replication and generalisation of workplace learning research.

These recent developments show that learning from errors at work is a field of study that is growing stronger both in quantity and quality. However, despite these advances, there are still many open questions, challenges and unsolved problems, which will be addressed in the next Section.

26.5 Open Questions and Unsolved Research Challenges

A number of sections in this chapter have acknowledged the difficulties associated with precisely and conclusively (valid across disciplines) defining an error. Research on learning from errors in work contexts still faces theoretical and methodological challenges. One of the fundamental problems is that an error logically emerges only at the exact moment of failing. However, empirically, an error emerges at the moment when an action creates a result that eventually is evaluated to be an error. From a theoretical perspective, an error originates in that moment when somebody identifies the faultiness of an object or process and refers to eventual reasons (e.g. levels of action regulation). These distinctions give rise to the following methodological challenges for the investigation of errors and the ways of dealing them: (a) since errors can be attributed differently, there is a need to adopt a particular research perspective (i.e. micro-, meso-, macro-level of analysis); (b) since the evaluation and the understanding of errors may differ across individuals, the comparability of data collected from different people is questionable; and finally, (c) the clustering of error cases into different categories of severity is necessary.

Table 26.5 Levels of analysis in research on learning within work settings

Levels of analysis	Evaluation studies	Studies on learning transfer	Studies on learning from errors
Micro I: individual reactions and attitudes	Reaction	Transfer motivation	Error orientation
Micro II: individual effects	Success/learning	Learning success	Negative knowledge
Meso: effect on immediate environment	Transfer/behaviour	Horizontal learning transfer	Negotiating change of procedures
Macro: sustaining organisational effect	Organisational success	Vertical learning transfer	Establishing new practices/socially shared negative knowledge

26.5.1 Research Perspective

Most educational research projects on learning at workplaces investigate the effects of trainings by studying work-related training or the transfer of learning into workplace performance. Broadly, such research acknowledges four different levels of analysis: (1) the level of individual reaction on learning stimuli, (2) the level of individual learning success, (3) effects of individual learning on the immediate work environment and (4) effects of individual learning on the organisation (e.g. Baldwin and Ford 1988; Burke and Hutchins 2007; Kirkpatrick 2005). Table 26.5 shows that these levels can also be applied to analyses of learning from errors at the workplace (Harteis et al. 2012).

As discussed in Sect. 26.4, empirical studies on learning from errors use specific theoretical and methodological lenses. A survey of these studies suggests that individuals are the crucial agents committing, identifying and dealing with errors. However, they are always embedded in the environmental and social setting of concrete workplaces. Table 26.4 shows that cross-sectional studies – on the one hand – focus on specific variables at specific levels of analysis. Their results, hence, are specific to that level of analysis. On the other hand, there are studies that focus on specific error-cases that span various levels of analysis, but their results are difficult to generalise. Currently, there is a need to examine the process of learning from errors at different levels of analysis and, the more importantly, the linkage between these levels. Multi-level analysis can serve the purpose but it is difficult to realise empirical designs that fulfil all the criteria for application within the daily workplace setting (cf. Bauer and Mulder 2013; Leicher et al. 2013). The observation that much of research on learning from errors focuses on micro-level analysis suggests that these studies do not offer insights that can be derived from exploring

errors on the meso- or macro-levels. However, the ultimate goal of investigating learning from errors is to improve individual and social practices of dealing with errors. Research designs should be developed and implemented with a view to achieving this goal.

26.5.2 Error Types and Severity

Chapter 1 presented the taxonomy of errors proposed by Hofmann and Frese (2011a). This taxonomy distinguished errors based on different levels of cognitive action regulation. This cognitive approach to classifying errors dates back to the works of Reason (1990) and Rasmussen (1987). Fewer attempts have been made to distinguish errors by their scope, that is, by the severity of the effects resulting from them. While it seems plausible that in practice ‘small’ errors, which concern just a few persons, will be dealt with differently than ‘big’ errors, which affect many persons, there is little evidence that explains how scope of errors relate to their learning potential. Several authors have suggested that small-scope errors or the so-called ‘near misses’ (i.e. errors that did not result in adverse events) bear a special learning potential (e.g. Aspden et al. 2004; Barach and Small 2000; Glendon et al. 2006; Oser et al. 2012). The rationale behind this assumption is that the analysis of small-scale errors is free from the emotional strain and stress of error management, allowing cognitive resources to be allocated to the analysis of potential error causes. To our knowledge, however, this conjecture still has to be validated empirically. An important research question in this context would be if ‘small’ and ‘big’ errors are dealt with differently across various test-persons.

From a methodological point of view, the cognitive error typologies discussed by Reason (1990) or Hofmann and Frese (2011a) and severity-based classification are problematic. The first one refers to levels of action regulation, which implies knowledge about the mental processes underlying the error case. However, this knowledge is not easily accessible as a vast number of research on intuitive decision making and behaviour indicate that knowledge may remain tacit (e.g. Betsch and Haberstroh 2005; Sadler-Smith 2010). Severity-based categorisation of errors tends to further complicate the theoretical problems addressed above that arise from individual differences in processes of error attribution. Because the understanding and interpretation of error incidents can differ greatly among individuals (Harteis et al. 2008), it may be difficult to empirically measure, the potential magnitude of an error. For this purpose, it would be necessary to either ask all concerned persons about their perception of the error case (which, of course, raises the issue of error attribution) or involve a third person to judge the case or situation (which raises the issue of validity of that judgement). Another alternative – which further complicates the issue – was introduced by Oser and colleagues (2012) who studied participants’ experiences of almost-errors, that is, incidents that almost failed but induced emotional and cognitive responses similar to factual error episodes. Thus, instead of distinguishing types of errors, they recommend a classification based on subjective

experiences of episodes which (almost) fail (Oser et al. 2012). Rausch (2011) also experimented with a promising strategy that focuses on the emotional reactions induced by error situations and their learning implications.

26.5.3 Problems of Validity

While it is important to understand episodes of dealing with errors, it is also equally important to explain the influences that promote or restrict learning from errors in the context of daily working life. This brings into focus the explanatory power of the data generated by empirical studies. It is well known that explanatory power is higher if the various cases observed in empirical studies coincide in their pattern of dealing with errors and their effects. Empirical evidence on how best to support learning from errors originates from clear and coherent patterns of reactions of different test persons or subjects. However, this evidence implies that the individual reactions of the subjects are comparable, which is not necessarily true. In fact, one of the main methodological challenges in investigating learning from errors is the requirement to keep information comparable across all test persons when different approaches to dealing with errors. The issue of authenticity emerges as soon as concrete error episodes are to be integrated into empirical studies. Two options exist: the first option – used in qualitative research – entails asking the subjects to recall and describe error episodes in order to gather reflections and mental processes related to these episodes. The second option involves the use of standardised error episodes that elicit reflections. Both options bear specific advantages and disadvantages (Bauer 2008).

The investigation of recalled error episodes provides access to subjective experiences of dealing with errors, but only in the context of individual interpretations. These may be problematic for two reasons. Firstly, individual biases, memory gaps or social desirability may colour subjects' responses, which may severely limit the validity of such data. Secondly, analysing experiences of different subjects demands the development of analytical patterns that allow for comparison of reports from different subjects, situations and workplaces. However, the data generated refer to different episodes and backgrounds. These analytic patterns reflect researchers' theoretical assumptions about subjects' way of dealing with errors. It is the quality of these reflections that shapes the quality of the analyses, as also the quality of findings and their explanatory power.

The second approach of presenting standardised error episodes (e.g. by vignettes or videos) generates data that refer to the same episode. It allows, therefore, the direct comparison of answers from different subjects. However, this research strategy forces subjects to describe possible reactions within their working environment. At best, it is a hypothetical (and subjectively biased) description of what would happen if the presented error actually occurred. In other words, this approach can only access hypothetical working practices. Its explanatory power depends on whether the hypothetical working practices represent factual working practices.

Both the options of investigating learning from errors bear challenges that relate to the authenticity of research material – whether created (i.e. standardised stimuli) or induced (i.e. remembered episodes). The development of standardised stimuli that are experienced authentically by the subjects requires in-depth knowledge about the workplace conditions. The presented stimuli should be relevant to the individual as well as to the organisation. Otherwise, the generated data may not be useful. For such research attempts, it may be better to first conduct qualitative research that explores the processes and conditions of learning through errors in the sampled working environments. A triangulation study design should be considered to increase the validity and reliability of the data. Further research should probably aim at developing a framework that enables researchers to compare cases of authentic error episodes.

26.6 Conclusions and Practical Advice for Further Research

Over the last two decades, the issue of learning from errors has become increasingly popular in the field of educational research. The theoretical underpinnings discussed in this article reveal challenges for investigating as well as facilitating learning from errors at the workplace. The processes of identifying and dealing with errors are highly dependent on subjective interpretations and assumptions which may differ substantially across subjects. Additionally, the environmental settings at workplaces shape the context for dealing with error cases. Hence, subjective as well as collective influences essentially guide the practice of dealing with errors. Empirical studies usually focus on specific levels of analysis, specific cases or specific organisations. There is still a need for larger field studies, cross-sectional as well as longitudinal. Large cross-sectional studies can clarify the interrelations between individual, collective and organisational approaches to dealing with errors (e.g. by applying multi-level analyses). Longitudinal studies would allow for identification of learning processes and outcomes resulting from errors and their individual and organisational impact. This will help overcome the problem of studies relying on subjects' remembered error episodes and their descriptions of how these errors were dealt with.

Though errors are still a sensitive topic in most work settings, the willingness of organisations to address this issue proactively and to participate in related research projects seems to have grown. One reason for this is that programmatic concepts underlying present-day work organisations support openness to critical issues and workplace learning. The globalisation paradigm has introduced permanent changes in and fierce competition among enterprises in all economic and administrative sectors. Future demands are expected to change quickly and remain at least partly unpredictable. However, enterprises and their employees have to react appropriately and quickly; that is, they should be able to act competently and should commit to the idea of lifelong learning by continuously developing their competences further. Approaches that favour strict regulation of inner-firm processes are considered

inappropriate because future development is not foreseeable. Hence, employees should behave innovatively and creatively within their teams. Such behaviour, however, implies the risk of failing, which necessitates that employees and enterprises adopt an open approach towards errors (e.g. positive error culture and error orientation) (Gartmeier et al. 2009). Educational research on learning from errors is, therefore, relevant and important to most organisations.

Nevertheless, researchers may experience a different reality. Enterprises still perceive inner-firm practices and organisational behavioural patterns as their private concerns and may be sceptical about the usefulness of opening their gates to independent research, particularly on learning from errors. Industrial and service companies often conduct such research either within own departments (e.g. human resource development, organisational development) or by hiring commercial consultancies, because these options allow them to control the results and findings. Independent research, of course, may uncover uncomfortable results, especially if there are wide gaps between programmatic ideas of business philosophies and practices of social behaviour. Moreover, independent researchers are keen to publish findings and discuss them within the scientific community.

Thus, getting field access for research on learning from errors can be quite challenging. Our experience of working with organisations in the industry, service and healthcare sectors suggests that two basic requirements have to be met for getting access. First, as it is probably the case for most research in organisations, it is necessary to get access to and convince one or several upper management members. Typically, this will be a person in charge of organisational development, quality, or personnel management. We found that – once the ice is broken – these people are frequently intrinsically motivated to adopt a critical approach towards errors and to receive suggestions for improvement. Here, gaining trust of the organisational members is as important as making solid mutual agreements on the later use of the gathered data. A key issue is to ensure that data on errors remain anonymous and are not used for taking disciplinary or legal action against individual members of the organisation (a major problem in the health care sector). Moreover, the researchers should be able to provide a compelling plan for the implementation of the study and show how the data will be useful for organisational development. For the latter, it is helpful to highlight the synergies between the research project and efforts that are already being made at the organisation.

Once field access has been granted, a second, and maybe even more challenging, step is recruiting participants from the organisational staff. In our experience, getting access to the company through the management has rarely ensured the participation of big groups of employees. In the case of research on errors, the managements' support might even arouse suspicion and negative reactions on the employees' part. To alleviate such concerns, researchers should communicate with employees' representatives and negotiate the details of data collection with them. Building a trustful relationship will involve stressing the independent role of the research team, clarifying the intended use of the data and explaining how the findings will improve their work. Despite such efforts, problems may occur, especially if the representatives of the management and the employees strive to accomplish their individual

(and potentially opposing) goals and demand concessions from the researchers. Hence, constraints have to be acknowledged which may sometimes require pragmatic thinking on the part of the researchers.

After the study has been conducted, efforts to communicate its results should go beyond providing a written report. Practitioners in organisations frequently lack the skills to interpret research data and to consider their conclusiveness. Moreover, with a topic as sensitive as errors, conflicts of interpretation might occur among the organisational stakeholders. From our perspective, it is a good practice for the research team to conduct joint workshops with all concerned parties to discuss the results and potential conclusions of the study. The researchers' role in this context is to communicate key findings, facilitate their interpretation and clearly state the limitations of the study.

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Chapter 27

Learning in the Circumstances of Professional Practice

Stephen Billett and Raymond Smith

Abstract This chapter discusses what constitutes learning in the circumstances of professional practice. It progresses from the perspective that examining learning in and through work supports opportunity to make visible and interrogate the complex array of factors that necessarily combine and transform to identify and explain learning as the process and product of engagement in practice. Its elaboration of these factors is framed by two sets of interrelated concepts. First and primarily, the chapter advances learning in practice as the integration of three learning attributes or perspectives of practice. They are; curriculum practices, pedagogic practices and personal epistemological practices. Together, these three perspectives comprise a framework that enables the incorporation and consideration of a second set of concepts, namely, social, situational and individual contributions to the enactment of learning in the circumstances of work as the integration of curriculum, pedagogy and personal epistemology practices. Learning is advanced throughout as co-occurring with work and the practices by which it is constituted. More than being relational and interdependent, the practices of and contributions to work are viewed as negotiated and always generative of change due to the transactions that characterise the dynamics of workers' engagement in the activities of their particular occupational practice. Practice is transformative of the people, places and practices engaged in its enactment. Here, these factors, their interrelationships and consequences are discussed in terms of understanding and enhancing learning experiences in the circumstances of professional practice that is work.

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27.1 Work, Learning and Practice

Learning through practice has been, and continues to be, the principal process through which work, the production of goods and services on which human society depends, is enacted and developed. Work may be viewed from many personal and social perspectives. It may be seen in terms of occupations and professions and vocations that are entered into, taken up, learned and practiced through doing what is necessary to make a way in the world, to secure a present and future livelihood (e.g., Noon and Blyton 2007). Equally, work may be seen in terms of skill development and deployment, structured and guided participation in culturally organised practice and the formation and positioning, also the transformation and repositioning, of knowledge, identities, systems and values (e.g., Billett 2010b; Rainbird et al. 2004). Further, work may be seen as the site, process, function and outcome of effortful endeavour characterised by purposefully bringing together all the material, ideational and personal resources necessary to accomplish things, to get things done (e.g., Smith 2012a; Edgell 2006). So, work is a complex human activity that can be viewed from many different perspectives, each enabling some illumination of how it is enacted and accomplished as a personal and social practice. In all, work and the socio-personal practices by which it is recognised and conducted can be understood as workers' engagement in and the legacies of being and learning in circumstances of professional practice. Understanding how people learn through their work, through their experiences in circumstances of professional practice, and potentially seeking to promote and improve that learning is important for the continuing and sustained development of the people, systems and resources necessary to human flourishing and the production of goods and services on which this depends.

This chapter discusses what constitutes learning in circumstances of professional practice and some of the considerations necessary to its promotion and improvement. In doing so, the chapter elaborates some of the bases of professional practice from which workers' actions and interactions can be examined as factors and processes of learning. Workers of any and all occupational persuasions (i.e. from astronauts to zoo keepers in would seem) are always actively, and to varying degrees, engaged in and with all the resources that constitute their practice. Accounting for these resources and the range of relational and interdependent processes that hold among them assists understanding learning as both practice and practise, that is, as the act and the activity in which workers are engaged (Smith 2012a). Through this elaboration, the chapter advances and discusses a conceptualisation of learning in circumstances of professional practice as comprising three inter-related attributes or perspectives of workers' participative experience. First, workers' engagement in practice comprises the requirements of

work; the tasks, tools, systems, colleagues and all the negotiations and encounters engaging with these requirements demands. Such experiences may be said to constitute a curriculum of practice, a set of enactments required and afforded by the work to be conducted. Second, workers' engagement in practice comprises the ways and means by which their enactment is enabled, supported and enhanced (or equally, constrained and hindered). These experiences may be said to constitute a pedagogy of practice, a set of guiding and shaping actions and activities that mediate work. Third, workers' engagement in practice emerges out of their personal understanding and construal of the goals and requirements of work. Workers bring their personal histories or ontogenies, their purposes and priorities to the conduct of their work, ensuring their engagement in practice is always a personal enactment of self in action. These experiences may be said to constitute a personal epistemology of practice that is based in the legacies of previous experience and a trajectory into shaping how the unfolding future will be constructed and comprehended (Billett 2009; Smith 2006).

Together, these three perspectives of workers' participative experience advance a threefold framework of learning in circumstances of professional practice. The framework conceptualises learning through its co-occurrence with work in ways that account for and illuminate its negotiated qualities. These qualities are more than being relational and transformative, that is, varyingly meditational and generative of change. Rather, learning here may be seen as intentionally enacted as workers' bring into purposeful relationship, that is negotiate, the numerous resources that constitute their practice. Equally, change is transacted. The transformation of person, place and practice that accompany purposeful engagement in work are shaped by those who work as they negotiate their enactment of their work. So, the conditions, processes and outcomes of learning that comprise its enactment in circumstances of professional practice are interdependent and accountable in identifiable relationships of engagement and transaction rather than simply visible as relational properties of workers' interactions (Smith 2012).

The chapter concludes its discussion with a focus on enhancing learning through practice. Possibilities for the promotion and improvement of learning in circumstances of professional practice may well be founded on the explicit and supported integration of workers' experience across the curriculum, pedagogy and personal epistemological bases of engagement advanced. Acknowledging the co-occurrence of work and learning as the two sides of the coin of professional practice supports the need for an examination of the actions and interactions that constitute workers' enactment of the participative practices that comprise their engagement in practice. More than 'doing', and more than 'doing with others', learning comes to be seen as both an act and a context, both a process and an outcome, both a personal and a social accomplishment that is negotiated in the enactment of engaging in practice. When the circumstances of that practice are more visible, acknowledged and integrated in experience and the transactional qualities of practice as the purposeful transformation of people and resources are equally visible, then, learning may be enhanced (see the Billett and Choy, Chap. 18, in this Handbook).

27.2 Learning in the Circumstances of Work: A Curriculum of Practice

Understanding how people learn through their work and potentially seeking to improve that learning is important for a range of personal, workplace, community and societal reasons. It can assist individuals secure and sustain their employment, realise their occupational goals and contribute to the continuity of their workplaces. This learning also often serves the needs of their communities and nations. The services and goods provided by these workers are often essential to their communities and, collectively, for the social and economic good of nation states. Moreover, the viability and continuity of those workplaces is also usually premised upon their workforce's capacities as work requirements change. Yet, preparing occupational capacities, extending further and sustaining them across working life have all traditionally been realised through the circumstances of work (Billett 2010b). The term 'the circumstances of work' is adapted from the 'circumstance of practice' coined by the anthropologist Jordan (1989) and is used here to describe the range of situations in and through which paid work activities are undertaken. These are sometimes labelled as workplaces such as in: shops, factories, hospitals, schools, warehouses, hairdressing salon, offices, etc. Yet, much work, and learning about it, is undertaken outside of these kinds of workplaces. For instance, for truck and taxi drivers, their vehicles are the places where they work and learn, as are aeroplanes for those who pilot and attend to passengers in them. Then, there are sites of work that are temporary as in building sites, gardens being tended, offices being cleaned, and homes where patients and the aged are visited, etc. Then, there are those who perform their work largely alone and/or from home, for instance, or in airports and on planes. Consequently, the term 'workplace' does not fully capture the range of spatial and social settings where individuals engage in their occupations: paid employment. There is also often a need to understand the kinds of engagements, relationships and interactions that comprise work, and through them individuals' learning.

The work activities and interactions individuals engage in are central to how and what individuals learn through their work. Hence, they constitute key elements of practice-based curriculum, that is, the set of enactments and resources necessitated by work and the learning on which it is based. Also, a consideration of circumstances accommodates the fact that these activities and interactions occur at particular moments in time, and in response to specific requests, needs or problems. In these ways, the term 'circumstances of work' is seen to be inclusive of the physical and social circumstances where occupational practice are enacted, the kinds of activities and interactions that occur and the dimension of time and societal imperatives that shape how they are enacted. Moreover, these circumstances and their attendant activities and interactions are central to the learning required to realise the abovementioned goals, even though the importance of this learning is not always recognised in an era of institutionalised education, training and schooling. Therefore,

for these reasons, it is essential that the curriculum processes and resources of learning through practice be more fully understood, including identifying how experiences in the circumstances of work can effectively secure the kinds of learning workers want and workplaces and national well-being requires. Freed from the constraints of learning through practice being only associated with institution-alised educational provisions, the process of what constitutes human learning in and through work activities can be approached in ways that captures more typically how these processes and attendant resources progress. That is, how the curriculum of work practice is (i) suggestive of workers' appropriate action, (ii) realised as the subsequent action workers undertake and (iii) is generative of the outcomes or legacies of workers' actual enactment of their practice. Each of these three elements of the curriculum of work practice is elaborated below.

27.2.1 Suggesting Appropriate Action – The Intended Curriculum

First, work may be viewed as a highly structured, goal-directed sequence of activities and associated outcomes. The resources and processes that enable work are purposefully brought together in ways that shape and direct what 'should' happen, what workers 'should' do and how activity 'should' progress. In this way, work constitutes a set of intentions that can be viewed as comprising an intended curriculum. The intended curriculum of work practice is what 'should' occur. So, machines will be serviced and their effective operation ensured when the correct procedures are enacted. Production costs will be lowered when workers perform their tasks more quickly and efficiently and the ratio of outputs per unit of input increases. Following instruction in the correct use of equipment the incidence of unsafe practices should decline. With sufficient and correct practice expertise will be developed. Such statements capture the nature of learning through practice as the accomplishment of desired outcomes or intended aims and objectives. Unsurprisingly, much of work and the learning on which it is based is shaped and guided by such 'intents', that is, the structure and content of work tasks and materials support the achievement of that which is intended. So, more than being suggestive of workers' appropriate actions, work as an intended curriculum is directive of the goals to be achieved and procedures that accomplish these goals. Much of this is captured and made visible in the manuals, protocols and policies that proceduralise work and can be attributed to those who organise, govern and monitor work. Equally however, the intended curriculum can be tacit and internalised as sets of expectations that 'should' be met or 'will hopefully' be met when action is required. The intended curriculum is held, both materially and ideationally, in the planning for and anticipation of what action is required and what outcome is desired.

27.2.2 Realising Action – The Enacted Curriculum

Second, and following from its intentions, work is the enactment of those intentions within the enabling parameters of the specific context and situated conditions in which it is conducted. The nature of that enactment is variation, altering conditions (sometimes favourable and sometimes less so) and the practicalities of dealing with what is available and possible at the time as work requirements change. Work in this sense is the conduct of what is possible, what is enacted under operant circumstances. In this way, work constitutes what can be viewed as an enacted curriculum. The enacted curriculum is what ‘happens in practice’ and this as the realised and subsequent action of what was intended. So, drawing on and extending the illustrations above, the machinery was only partially serviced due to the lack of suitable replacement parts and will need to be re-serviced when those parts arrive. The full and correct procedures could not be followed. Production costs were not lowered because despite the greater efficiencies achieved by workers’ increased efforts, the costs of raw materials increased. Further instruction in the correct use of equipment, beyond that previously provided, may be required due to the proposed introduction of new and different equipment. Opportunities to practice and thereby develop greater expertise have altered due to the partial servicing of current equipment and the introduction of new equipment. Such variations are familiar aspects of work and capture the nature of learning through practice as being able to do only that which can be done - despite the best intentions (documented or otherwise) of planning and expectation. The enacted curriculum of work practice is the implementation of intentions. Within the constantly altering actualities of work it is unsurprising that what is done differs from what was intended.

27.2.3 Outcomes of Action – The Experienced Curriculum

Third, and following from what is enacted, the outcomes or legacies of what workers secure from their experiences in tandem with their construal of and personal investment in those experiences, shapes how and why they enact their work in the ways they do. So, work is different for each individual worker due to their variable ways and means of making sense of their experience. Similarly, for any single worker, the meaning of their work is constantly shifting as they progress through their enactment of it in the varying circumstances of their levels of engagement (as mediated by their equally varying levels of interest, motivation, fatigue, concerns for quality, etc.) In this way, the curriculum of work practice may be said to constitute what can be identified as the experienced curriculum. The experienced curriculum is what learners ‘make’ of their practice. So, again drawing from and extending the illustrations previously used, for some workers, the prospect of having to re-service machines because appropriate parts were not initially available is frustrating and perhaps a hindrance to their learning. Yet, for others, this prospect may be

welcoming because it grants them another opportunity to engage in preferred practices and so enhances their learning. The failure of production costs to fall was a disappointment for those who benefit from productivity bonuses but became a source of personal pride for those workers who experienced their increased efficiency as indicative of their commitment to their colleagues. The further instruction required to operate the new equipment was class room based and became a rewarding experience for those who learned best by watching and listening and a very unrewarding experience for those who learned best through greater hands on opportunity with the equipment. The reduced opportunities to use the equipment demotivated those wanting to develop work specialisation on that equipment but energised those who now had additional time to pursue other work interests. In this sense work is a diverse set of potentialities for learning that cannot be predetermined. Rather, the learning qualities of work as curriculum are based in learners' appreciation of their experience and the meaning and value they construct and secure from what they do. It is unsurprising that workers will differently interpret and value their work and learning experience.

These three perspectives of curriculum, (i) the intended, (ii) enacted and (iii) experienced curriculum, highlight how the practice of work and the learning it generates and requires is partly established in the sets of resources and interactions on which it is based. These resources and interactions guide, push and cajole workers into necessary acts and activities that as much as they are designed and goal directed, they are equally context and process limited and person dependent. The successful integration of these aspects of practice as curriculum can support learning through practice as a coherent sequence of welcomed and valued activities. Equally, poor integration of intention, enactment and experience can make work and learning through practice a difficult and unrewarding path to follow.

27.2.4 Curriculum – Origins and Structures

The original meaning of curriculum is a pathway or a track to follow (Marsh and Willis 1995). Its usage derives from the Latin *currere*, meaning 'to run'. This conception provides a strong basis for understanding how curriculum practices are constituted in the circumstances of work. For instance, the 'learning curriculum' was proposed by Lave (1990) through what she found in her study of apprenticeship learning of tailoring in Angola. She noted that these novices progressed through a series of work activities that were structured to support the learning of tailoring. The structuring of these activities allowed the apprentices to initially understand the goals (e.g. standard of work) and outcomes of the work in which they were engaged and also permitted them to progressively participate in activities organised on the basis of difficulty and tolerance of error. Progression along this path of activities was premised on being able to effectively complete tasks of increasing difficulty and that had higher error cost (i.e. consequences when mistakes were made). Similar arrangements have been identified in other cultural practices and occupational fields

including the manufacturing of pottery in Japan (Singleton 1989), the building of minarets (Marchand 2008), in the production and packaging of food products (Billett 2000), and how hairdressers learnt their skills in hairdressing salons (Billett 2001). In historical accounts, these kinds of arrangements have been identified as the perennial means for learning crafts within family and commenced with children engaging in play-like activities associated with the family's business, as exemplified in early India (Menon and Varma 2010) and in Hellenic Greece (Lodge 1947). As Lodge writes of learning crafts in Hellenic Greece:

The son learned his trade by growing up in his father's family and participating in the family activities, imitating what he saw his father doing. At first the imitation would be playful and childish, carried out with such toy tools as a child could handle. Later it would become more deliberately purposive. Practice produced technical proficiency in details and the growing boy would act first as his father's 'helper', then as his associate, and would eventually himself become the head of a family, and the centre from which further training in the family craft would radiate. (Lodge 1947: 18)

So, the key feature of this work-premised curriculum is a pathway of activities moving from being those that can be easily undertaken by novices, and where mistakes can be tolerated and opportunities to practice are provided, and then progressing slowly through to engaging in more demanding activities that require greater levels of skill and build upon understandings and practices developed earlier in the pathway. For instance, Marchand (2008) refers to the earlier development of understanding about stone, cement, structure and work organisation later assisting apprentice minaret builders move to roles that ultimately permit them to have proximity to and then engage in constructing the most important parts of the minaret (i.e. the outside walls). Billett (2001, 2006) outlines how hairdressers learnt through participating in a sequence of activities largely premised on the linear progression of hairdressing. Firstly, they learnt to greet clients, and seat them, and also negotiating whether they would like a hot drink (i.e. tea or coffee). Even these seemingly straightforward and binary negotiations deployed and developed capacities that were built upon later. The negotiations about whether the tea or coffee was to be black or white, with or without sugar lead to other and incrementally more negotiations about water temperature when washing hair and then discussions about the style and type of hairdressing that was requested and whether it was possible to accede to and fulfil that request. The progression of the apprentices' tasks continued through washing clients' hair in preparation for being cut through to washing out dyes and chemicals when clients had had those kinds of procedures. Then the novice hairdressers practice cutting on men, before they were permitted to cut women's hair.

Further, the practice of hairdressing across four different hairdressing salons in different locations was found to be quite situationally-distinct in terms of goals, range of activities, workplace practices, clientele, location, and interactions among employees and between clients (Billett 2001, 2006). Moreover, the learning curriculum differed across these salons. The salon that had a large number of hairdressers and apprentices was able to adopt a production line like approach with the most experienced hairdressers undertaking the more demanding tasks and leaving the

apprentices to largely engage on washing hair and rinsing away chemicals and dyes, cleaning and providing drinks to clients. Yet, in another salon where there was an expectation of each client having their own stylist, apprentices had to engage in the entire range of hairdressing tasks earlier on. Because of these situated requirements for performance, a particular hairdresser's capacities would not easily adapt to practice in another salon. Whilst all of these practitioners might be able to perform the procedures required of hairdressers (i.e. cutting, shaping, colouring hair), commonly understand the precepts for practice (i.e. identify what your client wants and respond), and the dispositions associated with such a form of service occupation, there were profound differences that would defy the ability to be successful by merely shifting locations. In one salon, the hairdressers needed to know their clients' life histories and families, because companionship and social engagement was a part of the hairdressing task. Many clients were lonely old widows who came as much for companionship and to meet friends, whose appointments were scheduled at the same time. Consequently, without knowing the clients' personal histories, their hairdresser cannot fulfil the goals associated with this social intimacy, because they would lack appropriate familiarity.

So, there are bases in the organisation of workers' activities that are part of the circumstances of work that are structured and can assist their learning experiences in ways that comprise a curriculum for the circumstances of work. It is this ordering through the curriculum that provides and sequences the activities and interactions from which individuals learn their occupational capacities. Yet, this ordering is mediated by the intentions that shape it, the enactments that realise it and the personal experiences that bring meaning and purpose to this curriculum of practice. Never fixed, but always dynamically integrated, the curriculum of practice maybe viewed as the negotiation of what is desired, what is possible and what is emergent from the bringing together of work requirements, work practice and the workers who make it happen.

27.3 Learning in the Circumstances of Work: A Pedagogy of Practice

Pedagogy is the means by which learning experiences are enriched in some way and most likely goes beyond the mere provision, organisation and sequencing of experiences in the circumstances of work (i.e., the practice curriculum referred to above). Pedagogy can be purposefully and intentionally structured as in the provision of learning support through guidance and instruction. Such views can narrow pedagogy to only those elements of learning through practice that are supported by teachers, most often in the form of vocational instructors and trainers. However, pedagogy can be incidental and an emergent quality of engaging in activity. Dewey (Dewey 1916: 310) emphasised the pedagogic nature of practice when he stated "the only adequate training *for* occupations is training *through* occupations" (Italics in the original). In expressing such sentiment, Dewey acknowledges the pedagogic

qualities of doing something because it is required to be done and the authenticity of this doing as the primary base of enriching learning experience. Work is not a benign activity. Goal directed and culturally driven, work makes demands of workers, to act, engage, participate and contribute. These demands are pedagogic, authentic defining aspects of work and cannot be considered as external to practice. Smith (2005) captures this sentiment in acknowledging the necessity of action as the foundation of workers' learning in and through work. Such views broaden the conception of pedagogy as encompassing practice and practise, the act and the activity in which workers are engaged. They move beyond concepts of pedagogy as embodied in the actions of instructors or the support materials of learning guides and the experiences they encourage, beyond the didactic, to view learning in the circumstances of practice as inherently pedagogic and identifiable across the range of actions workers enact in the work activities in which they are engaged.

Hence, the pedagogy of practice is very much premised upon learners' actions and the authenticity by which these actions are enriched (or impoverished). Within work, these learning actions are supported by learning processes that comprise observation, imitation, listening, questioning, judgement and effortful practice as the continuing and transformational re-enactment of required tasks and procedures by learners. So, just as work demands action, so it demands watching and listening and communicating with others. That is, just as workplaces demand learning, they demand teaching, or more fully, they demand and secure pedagogic practice as all that is watched, all that is listened to and all that is communicated with, become the pedagogic resources from which learning and work progress.

Close indirect sources of learning support (e.g. observation, listening) and guidance by more experienced workers whether in the form of interpersonal assistance (e.g. coaching, direct modelling, scaffolding) are consistently reported as providing access to and the means of engagement in and with much of the knowledge required for work. This pedagogy can also be enriched by particular work activities through which individuals come to engage, utilise, articulate, test, predict outcomes and monitor their progress. For instance, particularly rich pedagogic work activities are those meetings where workers have to discuss work activities, evaluate their approaches and consider the viability of options. These activities permit both novices and the experienced to engage in a process of aligning and reconciling what they know with what is being discussed or enacted, and then construct responses as a result of these interactions. Nurses' handovers are an example of such events. At these handovers, there is often a five stage process that is inherently pedagogic. Firstly, the patient is discussed in terms of their age, gender, circumstance and capacities, etc. Then, the condition or conditions of the patient are stated, followed by the treatments they have been prescribed and that are being progressed. Following this, the patients' progress with these treatments is then presented and evaluated and then, finally, the prognosis-likely outcomes for the future, are discussed, in which predictions are made, discussed and evaluated. All this comprises a rich pedagogic experience that affords opportunities for workers to engage in different ways and with particular levels of understanding and knowledge of procedures. Individuals can align what they know with what is being discussed, evaluate the options being advanced, and then

reconcile what they do not know or are uncertain about, and through following and evaluating the discussions also access and make judgements about conceptions, procedures and postulated outcomes. Together, these experiences can assist in processes of knowledge construction associated with their viability (Van Lehn 1989) or to overcome disequilibrium with understanding (Carlson 1997).

As indicated, nurses' handovers at the time of changing work shifts are rich pedagogic experiences established through workers' engagement in the routine requirements of their practice. These procedures mediate and enrich learning. In the very different work circumstances of fruit and vegetable packers, Smith (2006) identifies other learning enriching qualities of workers' engagement in practice. Such work begins in the very early hours of the morning. Sunrise marks orders yet to be packed as being late because the standard expectation is that all customers should get their produce first thing in the morning. For some workers, the imposition of deadlines to complete and dispatch orders at specific customer-required times demanded quick decisions that encouraged their learning. This fast response learning through the press for decisions about product quality and suitability contrasted with the relaxed conversations about customer preferences and anticipated future orders that took place towards the end of shifts where cleaning and restocking were less time dependent and, therefore, less rushed work tasks. In both circumstances, of constraint and abundance, time available represented a significant pedagogic aspect of the work and learning conducted. Additionally, Smith (2006) notes how novice packers learn the varying levels and areas of expertise enacted by their fellow workers. Some colleagues know more about some kinds of fresh produce than others as a result of the orders, customers and products most common to their work. Questioning and seeking support from the most appropriate colleague can enrich learning, save time and ensure customer satisfaction. However, the accuracy and reliability of information received from colleagues cannot be guaranteed, despite their expertise. So, for novices who are unable to accurately assess the reliability of the information they receive, questioning colleagues may prove a hindrance to learning as they act on poor or purposefully false information that is supplied out of ignorance, anger or in jest. For some novices, the lack of access to certain more experienced colleagues (because they were busy or elsewhere) proved beneficial for their learning as they fortuitously avoided receiving false information that would have caused them to make errors. Colleagues and their expertise are clear pedagogic aspects of learning in the circumstances of work. Engaging (or not) with them through the routine interactions that comprise work is not always structured by procedure or supported by circumstance. It does, however, remain highly pedagogic.

27.3.1 Pedagogy – A Relational Social Practice

So, the pedagogy of practice, premised on the actions of learners, is founded on the relational qualities of learners' capacities and opportunities to engage in and with the resources of their work. Beyond curriculum aspects of work, pedagogy

identifies forces of constraint and affordance and their sources in the range of resources that mediate participation in work and the occupational practices by which work is identified and performed. These resources include all the elements of work practice, for example, its social, situational and personal qualities. Enriching learning, and similarly impoverishing learning, is the relational enactment of both competing and complementary social, situational and personal practices that are dynamically transforming through time and place. Personally, the novice fruit and vegetable packers came to learn much about each other and much about the varying characteristics of fresh produce and the customers they were servicing as their relationships developed through the practices necessitated by their work. Situationally, the specific procedures of nurses' handovers defined that particular time and those particular practices as pedagogic aspects of their work. The necessities of practice hold strong pedagogic qualities. Socially, the same is true of occupations, as they have come to define particular and familiar sets of vocational practices. This is so much so that even those who have never worked in those domains have learned something of what it means and takes to perform such work. Such are the means of cultural communication that many 'know' the work of forensic scientists, hostage negotiators and north sea oil rig workers. Occupations, their mere titles, have pedagogic qualities as markers of vocational practice.

Occupations are cultural artefacts that arise through human and societal need and exist because they meet or address particular societal purposes (Billett 2011). Some occupations have existed across human history and are likely to continue do so. The satisfaction of basic human needs (e.g. food all year round, ongoing health care, personal needs, legal matters, financial management), as well as those associated with our well being (e.g. clothing, hair, transport) means that occupations addressing these needs will likely exist as long as humanity does. Nevertheless, even these enduring occupational practices are subject to transformation as social and societal imperatives change, and understandings and technologies modify. Hence, for example, the shortage of doctors in some countries is leading to an expanded role for other healthcare practitioners, builders' work has evolved as technologies and construction techniques and regulations have changed, as is the case for printers and watchmakers for instance. There is nothing new about transformations in occupations reflecting societal needs. Indeed, across human history, some occupations emerged to address particular needs and subsequently disappear or only have lingering status (e.g. fletcher, milliner, potter, smith, mason, cooper, miller etc) and are replaced by occupations that address emerging societal needs (e.g. software specialists, paramedics, pilots, educators). Moreover, occupations are positioned in distinct ways across different societies. So, in many countries nursing and midwifery are seen as being a paraprofessional occupation worthy of a university education, yet in others these occupations are held in lower esteem and status, and deemed not worthy of a university education (in Germany, for instance).

It follows that the occupations individuals engage in likely arise from societal need, are manifested in particular cultural contexts, have standing and means of participation that are often societally-premised (Billett 2011). Moreover, these factors directly shape or even regulate access to these experiences and thereby the ways

these learning experiences are enriched or impoverished. The legitimacy and standing of occupations is linked to their perceived importance and potential consequences for the community or individuals and a degree by which they are codified and regulated. Beyond the immediate perils that novice pilots, builders, doctors, accountants might bring, there are also concerns about those who teach children, nurse the sick, care for the aged and disabled, etc. So, not all occupational practices are equally available to be engaged in and learnt about, that is, accessed. In particular, occupations that are hierarchically ordered (e.g., health, military) or demarcated through historical divisions (e.g., trades work) or exercise potentially dangerous practices (e.g., electrical work, airline pilots), have regulated access. Put simply, the ability to access and engage in occupational practice and participate in attendant and associated pedagogic activities and interactions is mediated by social forces of perceived need and status.

Equally interdependent with, and therefore mediating of, the pedagogic qualities of work, is how they are enacted in specific workplaces and at particular points in time: the circumstances of work. Such are the diverse situational requirements, kinds of activities being undertaken and imperatives of the particular circumstances that they constitute the manifestation of occupational practice and what constitutes its performance requirements. That is, what constitutes domains of work activities is not limited to the exercise of canonical occupational knowledge. There is a complex of situational factors that determine performance requirements in the circumstances of work. These circumstances are those in which the occupational practice is enacted and judgements made about performance will be assessed. What constitutes expertise is the ability to reasonably successfully negotiate non-routine domain-specific problems within a domain of activities (Chi et al. 1982; Ericsson and Lehmann 1996). Yet, this expertise is premised on a profound knowledge of the domain of activities in which the problem-solving occurs. Hence, the capacity to be an expert practitioner and to be pedagogically supported through the development of this practice is likely to be quite situational and arises through engagement in very particular circumstances (Billett 2001). Therefore, in these ways, the circumstances of work are central to its enactment, remaking and transformation, as well as learning about and for it. The important point here, is that the particular activities and interactions that comprise what individuals will encounter and from which they learn constitute a pedagogy of practice that, beyond the organisation of experiences from which individuals learn (i.e., the practice curriculum), provide opportunities to assist observing, support listening, enable questioning, generate reflection, etc., (i.e., enrich learning), are shaped by situational factors. Therefore, more than being a set of social circumstances, the particular circumstance of work is central to the experiences provided for individuals to engage and learn through practice, as these two processes co-occur. This includes who is allowed to engage in it, what kinds of activities and interactions are afforded, and for what reasons, and the kinds of guidance from more experienced co-workers: i.e., the workplace participative practices (Billett 2004; Billett et al. 2004).

In sum, the organisation and enhancement of those experiences that enable and support workers' ability to access and learn an occupation constitute a pedagogy

of practice. This pedagogy is shaped by the set of cultural, societal and situational factors that comprise the circumstances of work. The social value of practice, rights to and methods of accessing practice, the learning requirements of the activities that constitute practice, the supportive qualities of the situational resources that enable practice and dispositions of individuals towards the circumstances of their practice, all hold capacities to enrich or impoverish learning. These capacities do not 'meet' in the benign construction and acceptance of positive and negative work opportunity. Rather, they co-occur as the negotiation of engagement in the circumstances of work to constitute a pedagogy of practice.

27.4 Learning in the Circumstances of Work: The Personal Epistemology of Practice

Much of the learning through everyday activities and interactions in the circumstances of work is dependent upon how learners engage with the activities and interactions they are afforded. Just as in education, learning through the circumstance of work can be viewed as invitations to change. However, unlike in education where teachers' intentions direct and shape the circumstances of learning, learning in and through work is enacted in the actualities of vocational practice where inequities of access to the kinds of knowledge that supports effective performance are experienced and sanctioned through such mechanisms as job demarcation, occupational status and organisational structures and capacities. In these circumstances, the kinds and qualities of learning that arises are largely dependent upon how individuals take up the invitations afforded them, negotiate the boundaries of access, construe the meanings and values of their experiences and transact the possibilities generated through their participation. More than curriculum practice that is enabled, enhanced and or hindered by varying pedagogic qualities, learning in the circumstances of work is person dependent as individual workers enact their occupational practice in their unique ways that are reportedly shaped by learners' observation, imitation and practice and largely mediated by their own agency, interests, intentionality, perception and energy (Billett 2009).

Personal epistemology conceptualises all that is distinguishably specific to an individual and the ways they learn. It, thereby, accounts for the different ways and focuses of what is observed, imitated and practiced and the varying values and priorities that are the bases of individuals' agency and actions. So, the personal epistemology of practice may be viewed as the sum of all the personal resources individual workers bring to their learning experience. It is more than their beliefs about knowing. It is the ways and means by which individuals make sense of their experience, frame it as theirs and project themselves into the future their actions enable. As such, personal epistemology represents the legacy of individuals' life time of engagement in social practice and their deployment of that legacy in immediate experience. It conceptualises ontogenetic development in terms of

learning and the very personal ways knowledge and experience are constructed and apprehended through active engagement in social activity. This active process of engagement is idiosyncratically unique and discernible in the personal practices workers enact, what Smith (2012) refers to as evidence of the self-in-action. It has been described as authoring the self (Holland et al 1998), peripheral participation in communities of practice (Lave and Wenger 1991), the meaning making process of implicit learning (Bunn 1999), the exercise of personal agency (Archer 2000) and, even, stealing knowledge (Marchand 2008 – in circumstances where a lack of learning support is characteristic of workers' situational experience and where more experienced workers deliberately conceal the knowledge necessary to successful work performance from their co-workers). Further, it is through these active processes of engagement that workers enact and develop their personal identities as practitioners, as workers, as learners, as people who, through varying levels of capacity and motivation, invest themselves in the purposes of their effort. Personal learning through practice is as much about constructing viable personal and vocational identities, exercising self and securing personal goals as it is about meeting the demands of occupational and workplace goals. Work and learning are always personal and always evidence of the unique ways individuals engage in their social world.

27.4.1 Work Learning and Person Dependence

The identification, examination and evaluation of personal epistemology of practice is partly based in the array of choices and changes (personal, occupational, etc.) workers enact through their actions in work. This enactment is richly complex with the reasoned plans and accidental discoveries of learning, the rehearsing and re-enactment of what is already known amidst the unceasing prospect that things are always changing, chosen responses to situational circumstance can always be adjusted or improved and that new learning is always required and always potential in even the most mundane of activities because every moment is new, every decision multivariate and every solution temporary. In such circumstances of work, workers may not be free to choose what they respond to but they may be free to choose how they respond to what is experienced and so influence the changes enacted in their work. For example, Hodkinson and Hodkinson (2004) describe the very different ways two teachers engage in and with similar practices and demands of their work. Both teachers worked in the same school, were white males of similar age and experience and were subject to the same staff performance review and management system. Where one viewed these performance management requirements as the imposition of external control that threatened personal practice, the other saw it as supportive and encouraging of personal practice. From such different interpretive bases, the two teachers enacted equally different sets of choices and responses. The former reflected on his practice as an individual accomplishment. His learning was based in personal judgements made through his enactment

of 'doing' his work, much of it immediate, unplanned and emergent from surviving through meeting others' needs (e.g., students, employer). The latter reflected on his practice as collaborative and future oriented. His learning was based in pursuing best practice, watching and adopting what others did and taking advantage of training provisions afforded by the employer. These kinds of differences, personal differences of perception, attitude and expectation enacted by these teachers in relation to similar work circumstances and requirements, highlight and evidence the significance of individuals' dispositions as the personal bases from which workers construe and construct their experience of professional practice. Of course, none of this is surprising. Different people see things differently and, therefore, act differently. What remains salient within a context of personal epistemology is the relational nature of individuals' subsequent activity and the ongoing negotiations by which their practice is sustained and developed. If workers fail to identify where and how they 'fit' within their practice, if they are unable to appreciate and capitalise on the positive affordances their practice generates or if they are negatively disposed to work requirements, then their learning is compromised. At best, they may struggle to progress their practice. At worst they may construct inappropriate or dangerous practice. Individuals' dispositions, to work, to learning, to opportunity, indeed to all the aspects of their practice are significant elements of the personal epistemology of practice.

The relationships individuals hold and develop are also significant elements of personal epistemology. Practice is always collective, mediating of and mediated by capacities to enact and manage ones' self with and for others. For example, Chan (2009) notes the intentions for learning are partly based in being seen by others as a worthy worker and being recognised as such. The criteria by which such worthiness and recognition are assessed and bestowed are often empirical measures of productivity open to the observation of others (e.g., colleagues, managers, customers, etc.). Expertise is calibrated against the clock in terms of time taken to successfully complete a task, competence is made visible in repeatedly demonstrating accuracy and performance gauged by quantities and qualities of output achieved. And so, workers' personal practice can be based in meeting measurable performance goals (for self and others). Striving (or not) to meet such targets can be viewed as aspects of workers' self-management, that is, personal practices enacted as means of managing what others think of them. Such practices address issues of relationship management that are foundational aspects of personal epistemology.

Smith (2012) describes how one particular fire fighter, at the beginning of every shift, checked specific items of equipment to ensure they were fully operational so there could be no doubt about their functioning correctly when needed in an emergency response. From an organisational perspective there was no need of this extra checking because such checks had already been conducted by designated others. However, this fire fighter's previous experiences of supposed checked equipment failing to function correctly when needed stood now as a personal priority to be enacted. Further, this personal practice was additionally justified (beyond being a legacy of previous experience) as being personally purposed to support fellow fire fighters' need to know their colleague was reliable. In this way, those fellow fire

fighters could be confident, in the event of an emergency response, that their colleague was fully prepared and able to assist in their very dangerous work – to the extremes of life and death situations. The personal practice of checking equipment, premised primarily on addressing previously experienced equipment failure, was also partly enacted as a means of managing colleagues' perceptions. To colleagues, this fire fighter would be seen as reliable and, thereby, a worthy worker.

Such examples of workers' personal practice illustrate the importance of personal cares and concerns as foundational of how and why individuals enact their practice in the ways they do. To view workers as merely pressed to make these choices and the occupational changes they generate through this exercise of agency is to over emphasise contextual influence and mitigate the significance of the personal values and priorities workers bring to their practice. These priorities also include the unique ways workers approach their learning and the preferences they enact as evidence of these approaches. Learning practices of observing, listening, imitation, questioning, rehearsing and reflection, may well be considered universal due to human capacities and the social nature of work and the interactions with tools, colleagues and procedural systems that work requires. However, this universality is not consistently practiced. An appreciation of individual differences (be they physical, psychological, ideological, etc.) alerts that workers' perception, apprehension and subsequent actions through the events of their practice cannot be homogenised by similarities of work instances and task requirements. Smith (2005) describes a novice fruit and vegetable packer's self-account of thoughtfully considering and reflecting on the requirements of his next task while being berated by the supervisor for mistakes made on an earlier order. The worker describes how the supervisor's actions, requiring him to stop what he was doing and pay attention to what he was being told, afforded him some time away from the immediate demands of his work and how he chose to use the time to think more fully about what was to come rather than what was actually occurring in the moment. This worker was purposefully not listening to the supervisor. This choice was not evident in his actions as he stood quietly before the supervisor. His personal approach to this learning experience highlights that listening is a personal practice, a prerogative exercised through choice and not a learning process that can be assumed because of the seeming curriculum and pedagogic qualities of the circumstances of work. Similar person dependent practices were evident when fire fighters were given opportunity to inspect the site of a fire they had attended the evening before (Smith 2012b). Such opportunities are extended to fire crews when senior managers are of the opinion that the site inspection in the full light of day could assist their training through reflection and debrief. Some fire fighters choose not to attend, describing the experience afforded as previously unhelpful and therefore likely to be so again. Yet, others welcome the experience and describe it as supportive of their learning as they can retrace their movements and see more clearly the results of their actions that were enacted in circumstances of very limited visibility and extreme danger.

In sum, learning in the circumstances of work is a highly person dependent practice. How workers construe and construct their learning though the experiences their work affords is the relational and interdependent process of engaging in and with all

the resources that comprise that experience. A significant and discernible set of those resources are workers themselves who bring unique personal epistemologies (e.g., skills, dispositions, priorities, values, etc.) to the negotiations between curriculum and practice, between self and situation and between current occupational practice and its press for transformation into better ways of doing things.

27.5 Transacting Practice Through the Negotiations of Learning

Learning in the circumstances of work, that is, the circumstances of professional practice as they are shaped by the specific requirements and particularities of situated production, is conceptualised here as the threefold integration of (i) the experience of curriculum that is (ii) mediated through pedagogy and (iii) enacted as personal practice. This integration constitutes practice as the interactive enactment of knowledge (Billett 2010a, b) that is always socially sourced and transformed through the collective and individual tensions and dynamic qualities of work. Contemporary work is characterised by contest and competition, by risk and immediacy, by temporary solutions and unceasing problems and by creative invention and opportunity as well as accident and insecurity (Beck 2000; Bauman 2000).

Bauman (2000) has described this complexity as ‘molten capitalism’, drawing on the metaphor of the immense power and volatility of the planetary core to capture the force and ceaseless pressures of globalised production, marketing and consumerism that makes work (as social institution and personal practice) unstable and unpredictable. In ways that retain this metaphor, Beckett and Hager (2001) describe the personal practice of work as ‘hot action’. By this is meant that work is increasingly characterised as the difficult endeavour of meeting the pressured demands of taking responsibility for being ill prepared to make the immediate decisions necessitated by newly emergent problems, all with the “nagging doubt that action might be inadequate – superficial, hasty and inappropriate” (Beckett 2001: 74). Clearly, from these perspectives, urgency, danger, risk and anxiety are central qualities of work (Beck 2000). However, more than volatile, the complexity of contemporary work is better captured by the speed and continuity of its transformation (Vallas 2001; Doogan 2009), that is, the degree by which occupational practice is changing.

27.5.1 Occupational Change

In its manifestation as occupation, that is, as the identification and demarcation of specific vocational practice, work identifies distinct capacities and requirements that categorise and valorise its complexities. For example, fire fighters risk life and

limb in social service. Their work is dangerous, physically and psychologically threatening as they deal with the destruction and trauma that fire can cause. Yet, the nature of fire fighters' work is changing as modern building regulations and safety systems are reducing the number of fire emergency responses. Increasingly, fire fighters' work involves attending motor vehicle accidents and engaging in public education exercises for the benefit of those such as property developers, highrise building managers and residents and school children (Smith 2012). The occupation of fire fighter is being transformed, and with it, new dangers and risks emerge as vocational practices that now include the dissemination of information, the development of interpersonal and organisational communication skills and the capacity to develop teacherly rapport with young school children are enacted. Given that learning and work co-occur and are dependent upon enactment of occupational practices, it is necessary to understand the form and dynamics of those practices. Indeed, their changing form, status and organisation all shape how participation in and learning through work co-occurs and does so, perhaps more evidently, in times of increasing economic turbulence and transforming occupational practice.

However, beyond addressing specific human needs, occupations are also both shaped and transformed by societal developments, including their history, technology and population. For instance, the organisation of work and the concept of skilled workers developed distinctly within Western and Chinese traditions, possibly on the basis of differences in populations. Skilled craft workers in Europe required an array of skills to perform the entire tasks required of trades workers in their locales with relatively small populations (Deissinger 2002). Yet, in Imperial China, the population was so large that the need to produce mass quantities of products arose far earlier than in Europe, and realised through teams of workers working together and contributing their specific set of capacities, (Barbieri-Low 2007; Ebrey 1996) rather than through solitary crafts workers fashioning the entire artefact, as in Europe. Indeed, the mass population and early development of metal working, porcelain, printing, woodworking and lacquer work in Imperial China was based on modular forms of construction, manufacture and even writing (Ledderose 2000) that has only existed in western countries in the most recent of times and led to distinct premises in occupations and occupational practice. So, the occupations individuals engage in likely arise from societal need, are manifested in particular cultural contexts, have standing and means of participation that are often societally-premised (Billett 2011). Moreover, these factors directly shape or even regulate access to these experiences. As noted earlier, the legitimacy and standing of occupations is linked to their perceived and accepted importance. The ability to access and engage in practice, participate in activities and interactions associated with the occupation mediates opportunities for individuals learning about those practices. For instance, learning a craft trade in many countries requires securing employment as an apprentice. Those unable to secure such employment cannot learn the trade, regardless of their interest in and potential to be a good tradesperson. In some countries, eras and situations, apprenticeships have been exercised within family or community (Aldrich 1999). For example, being apprenticed is restricted to members of a particular community for sustaining customary practices (Singleton 1989),

or to respond to local imperatives of ensuring young people are effectively employed and prepared (Aldrich 1999).

So, access to opportunities for learning can be constrained by societal and situational factors. Ultimately, this accessibility is also shaped by the fluctuating societal demand for the occupation, and any constraints associated with accessing and engaging in it.

Yet, beyond the manifestation of occupations in a particular country or region and era, is how they are enacted in a specific workplace at a particular point in time: the circumstances of work. Such are the diverse situational requirements, kinds of activities being undertaken and imperatives of the particular circumstances that they constitute the manifestation of occupational practice and what constitutes its performance requirements. For example, note the situational distinctions of the hairdressers and teachers referred to earlier. It is in these circumstances of professional practice that work and learning co-occur. And that co-occurrence, like the practices on which it is based, is evidence of the relational interdependence of societal, cultural, situational and personal needs, enactments and transformations that characterise occupations. Moreover, occupational practices, as advanced above, enable an understanding of learning in the circumstances of work as the integration of curriculum practices, pedagogic practices and personal epistemological practices. This conceptual framework enables the relational interdependencies of work and learning to be examined as learning practices that do not simply differentiate the contributions of the societal, situational and personal levels of engagement in activity, but, rather, as sets of integrated learning attributes or practices that are in constant negotiation and thereby, generative of learning through practice. At its simplest, individuals' integration of those practices may be viewed as a job and learning the exercise and action of effort necessary to perform that job and thereby indicative of the personal ways in which those practices are integrated. In more complex terms that integration may be viewed as the emergent and on-going process and product of the negotiations among all the resources brought together in and through its accomplishment. In this sense, learning through practice is the active evidence of those negotiations in action: the strategies available, enabled, deployed, the actions and decisions taken in evidence of this move and the outcomes accomplished and evaluated as the base of the next moves to be taken. From this perspective, learning in practice may be said to be transacted in the negotiations of curriculum, pedagogy and personal epistemology.

27.5.2 Purposeful Change – Negotiation and Transaction

The fundamental quality of negotiations and the transactions by which they are enacted, is transformation. Transaction is a conception of activity that captures the inherent unity and connectivity that is the nature of all actions. All action is transaction (Dewey and Bentley 1975). Transaction conceptualises the constant state of flow and transformation of all that is experienced. Rather than interaction,

as if things are separate, come together and then separate again, transaction holds everything together (weakly or strongly) in the unity of simultaneous influence and continuity that are the necessary conditions by which human activity is collectively accomplished. Dewey and Bentley (1975) make this point in various ways. For example, the air is not external to the body. The body is always and simultaneously in the air and of the air. People do not interact with air. Rather, the transaction of breath transforms the gases of the air into essential elements of bodily function. Likewise, the transaction of farming and harvesting and eating transforms plants into food, into essential nutrients, to be further transacted through the chemical processes of cellular activity that sustain bodily function. Similarly, the transaction of felling turns trees into wood and the transaction of milling turns wood into timber and the transaction of building turns timber into structure and so on as the flow of negotiated activity transforms the resources enacted through the transaction of practice. Equally, as for things so for people. As Dewey and Bentley (1975) observe when using the example of a commercial transaction where goods are exchanged; there can be no buyer without a seller – “both *parties* (the idiomatic name for *participants*) undergo change; and the goods undergo at the very least a change of *locus* by which they gain and lose certain connective relations or “capacities” previously possessed” (Dewey and Bentley 1975: 276). So, for example, in the negotiations that transact the sale of a motor vehicle, the buyer is transformed to become an owner, the seller to become unencumbered of an unrequired asset, the vehicle to become, perhaps, a prized possession, no longer unrequired. Through transaction, as commercial exchange and as the enactment of bodily and occupational activity, the resources, processes and relationships that characterise one set of experiences are transformed to become the basis of yet another set of related experiences. From this perspective, in the circumstances of work, to learn is to transact occupational practice and so transform personal and cultural practice through engagement in the negotiations among curriculum, pedagogy and personal epistemology.

So, people (e.g., their perceptions, positions and self-understandings, etc.), the situational resources enacted (e.g., tools, processes, meanings, occupational practices, etc.) and the relationships between them (e.g., trainer, practitioner, supervisor, novice, colleague, friend, etc – in conflict, collaboration, trading, caring, etc.) are always changing through the transactions that bring and hold them together in generation of the new relationships, new practices and new understandings that characterise their togetherness. Learning is often the term used to describe and explain these changes. Recall the nurses’ handover scenario referred to earlier. The nurses engaged in their routine handover activities are transacting their practice and through it all kinds of transformations are being enacted. For example, patients are being transformed as they move from being people who are description and evidence of a specific set of conditions and procedures that have been practiced to being people who will benefit from the continuing or altered treatment they are yet to receive. This transformation may be subtle and indistinguishable as when previous practice is re-enacted. Nonetheless, it has occurred. Sometimes this transformation may be pronounced as when decisions are taken to markedly alter treatment in pursuit of better patient outcomes for those who have not responded well to past

practice. Physically, the patient remains in their bed, a person to be cared for and respected. However, as purposes to be enacted, observations to be made and progress to be monitored, that is, work to be conducted, the patient is transformed through the considerations and conversations enacted by the nurses handover, particularly in relation to the prognosis stage of their practice. Patients may or may not notice the different ways they are treated when nurses' understandings of them change. However, this patient awareness is not the primary evidence of the transformation enacted. That evidence resides in the altered practices of the nurses who transact their work and learning in the circumstances of their practice that require handover consultations. Indeed, the transformation of patients may well be considered the primary purpose of nurses' practice. As much as the recuperative powers of the body are strong, so are the capacities of nurses' practices to enhance those powers through managed care that is a recognisable outcome of learning through practice. Nurses' practice may be conceptualised as transformation of the unwell into well (not necessarily physical) and this accomplished through the particular negotiations among curriculum, pedagogy and personal epistemology that constitute their practice. Such transformation is more than the transformation of the meaning of patients through negotiation. Rather, it is the actual transformation of patients (one of the many resources transacted in nurses' practice).

Similarly, the nurses are transformed as they transact their practice in the circumstances of work. Handovers demand active participation, the contribution of what is known and has been learned through the negotiations of the work. Patients' interactions with nurses, with medication, with family, with doctors, with the bed they are lying in, etc., are all important sources of information that need to be communicated and evaluated for handovers to be successful aspects of nurses' practice. Now aware of the altered conditions of their patients and the different practices that are planned for their on-going treatment, the newly arrived nursing shift moves into what could be described as reflective practice. This learning process begins with planning, is sustained through monitoring and culminates in evaluation. Just as nurses enact this reflective practice with a focus on their patients and evidence this in the handover, Jarvis (2004) advances that they, as adult learners engaged in socially directed activities, will similarly plan, monitor and evaluate themselves for the purposes of making sense of their experiences and making the necessary preparations for their next activity. Just as nurses practice transforms patients, so it may be considered to transform their understanding and practice of themselves, for example, as more or less competent, as more or less motivated or willing to embrace additional requirements of work, as more or less personally invested in the purposes of their work. Personal epistemology, more than the sum of what is brought to the negotiations of work, is constantly being transacted through practice as workers learn more about themselves through learning more about the procedures and requirements of their work.

As for nurses, so also for fire fighters, teachers, hairdressers and coal miners, who, as they transact their respective practices, transform themselves, their purposes and the very practices that mark the nature of their work. To capture the nature of this transformation and the working and learning on which it is based requires

a conception of practice that simultaneously comprises the distinctions of societal, situational/cultural and individual contributions to participation in work and the distinctions of curriculum, pedagogy and personal epistemology that mediate engagement. Concepts of negotiation and transaction can assist in making the diverse aspects and resources of practice more visible and accountable as learning. So, learning in the circumstances of work is the relational enactment of numerous interdependent elements of practice, the process and product of which is the continuing transformation of that practice. This enactment and transformation may be conceptualised as negotiation, that is, the purposeful bringing together of all the resources necessary to individuals' engagement in socially derived activity. Further, these resources may be viewed as comprising the integration of curriculum, pedagogy and personal epistemological practices.

In these terms, the promotion and improvement of learning through practice resides in making more explicit and open to evaluation the transactive nature of learning and supporting learners to negotiate more astutely and forcefully within the negotiations that constitute their particular circumstances. For example, curriculum is more than the content of what is to be learned. Rather, it is a set of intentions, actions and experiences that learners, those engaged in the immediacy of enacting professional practice, need to be aware of and supported to construct and manage as it is transacted. So where the intentions of curriculum reside wholly with instructors and accreditation regulators, this needs to be acknowledged and flexibilities established that enable learners' contributions both initially and throughout the processes of enacting, not others' intentions, but the negotiated intentions of all parties concerned. In this way, the transactions of professional identity and practice that will ensue through learning are explicit, open and accessible as shared experience rather than implicit, that is, closed and unrevealing of the compromise and contestation that marks ones enactment of others' intentions. Similarly, pedagogy is more than the methods of delivery adopted by instructors. Rather, it is the enriching qualities of learning experience. Much of what is undertaken in practice has pedagogic capacity that needs to be acknowledged and interrogated particularly given the learning practices of observation and imitation that underpin the bases of guidance that work and workplaces afford workers. And equally, personal epistemologies are more than workers' previous learning dispositions. Rather, they are sets of values, priorities and aspirations that mediate what individuals will invest themselves in and how much of themselves they will invest. Engaged and motivated learners cannot be assumed within circumstances of work that are increasingly characterised by change. Learning support requires assisting those who enact professional practice to be self-aware, cognisant of the preferences and prejudices they enact in their learning and how these act as criteria by which they evaluate their learning and qualities of the context in which it is enacted. Such criteria should not be simply accepted or assumed by those who support learning. Rather, encouraging and supporting learner engagement resides within the negotiations of what constitutes quality and how it is to be recognised and accomplished. These negotiations need to be explicit and all involved aware of how and why they contribute to these negotiations in the way they do.

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Chapter 28

Apprenticeship as a Model for Learning in and Through Professional Practice

Geoffrey Gowlland

Abstract Beyond the institution of apprenticeship, most strongly associated with Medieval guilds, apprenticeship can represent a powerful model to think about learning. Through a discussion of some of the most influential theories on apprenticeship learning in the social sciences, this chapter aims to find ways to think about apprenticeship in its complexity and diversity as a mode of learning, and specifically in relation to professional learning.

Keywords Apprenticeship • Professional learning • Communities of practice • Legitimate peripheral participation • Workplace pedagogy • Enskilment

28.1 Introduction

Apprenticeship is often associated with traditional crafts, and the Medieval context of production and guilds, and as such often characterised as an outmoded system of education. Apprenticeship is stereotyped as being largely carried out through non-formal processes of learning, rarely involving books, resorting to minimal verbal interaction, and involving a personal, usually one-to-one relationship between an apprentice and master. In contrast, the professions by definition involve extended periods of formal education in universities, with a significant part of the knowledge acquired through books, and learning in classrooms. Yet for long, apprenticeships have been the way of learning both crafts and the professions of medicine and law, and whilst the ‘traditional’ craft apprenticeships have virtually disappeared in the modern world, some of the few university degrees requiring some form of apprenticeship-like instruction are those preparing for the professions. Since the

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1970s, scholars in the social sciences – notably education sciences, cultural psychology, and social anthropology – have found it useful to isolate apprenticeship as a model of learning from its historical origins as an institution in Medieval Europe. The interest in apprenticeship as a model of learning resulted from a turn to new paradigms to characterise human learning, knowledge, culture and society, notably involving a rejection of normative models of learning and of culture as the unproblematic transmission of knowledge from one generation to the next (Palsson 1994; Ingold 2000; Lave 2011; Lave and Wenger 1991; Wertsch 1998). In contrast to the domain-restricted context of learning in the school classroom, apprenticeship learning has to make do with the uncertainties, irregularities, and abnormalities of the material and human worlds, be it the indomitable nature of craft materials (e.g. O'Connor 2006), or of human bodies under auscultation by doctors (e.g. Rice 2008). This has made apprenticeship particularly interesting as a tool to think about learning grounded in the 'real world.'

As soon as we start talking of apprenticeship, we come up against a problem of definition. Early attempts have suggested to define apprenticeship in terms of a context in which an individual wanting to access a certain kind of knowledge learns from one who possesses this knowledge (Goody 1982a), or as a 'multifaceted' context of learning that usually involves an economic dimension (Coy 1989a: 1). We will see that the path to redefining apprenticeship as a model of learning has led scholars not so much to characterise this form of learning as particular and distinct, but rather to rethink what is meant by 'learning' in the first place (see esp. Lave 2011). I will return to this in the chapter, but wish to suggest at least a working definition now: apprenticeship can be characterised as a mostly non-didactic way of teaching and learning, grounded in a local context and dependent on participation of the learner in work-related activities; the acquisition of skills during an apprenticeship involves, among others, social participation and interaction, observation and imitation, and engagement through the senses with tools and context. Apprenticeship is not simply an educational context in which learners acquire technical skills, but a learning environment in which worldviews, ethical engagement and moral values – in particular related to work, work identities, class, gender, and the place and role of skilled workers in society – are shaped as part and parcel of the process of learning.

One cannot isolate the process of acquiring skills from the social and physical context in which such a process takes place (Lave and Wenger 1991; Lave 1990). This challenges scholars to provide conceptualisations of apprenticeship that explain the acquisition of personal, embodied skills with reference to social interactions in the workplace, with peers, co-workers, and mentors. In this chapter, I present and reflect upon some of the most influential theories on apprenticeship learning in the social sciences in an effort to find ways to think about apprenticeship in its complexity and diversity as a mode of learning, whilst avoiding reducing it to a sum of its parts. More than an intellectual exercise, conceptualising apprenticeship as a mode of learning can bring us to reflect on the nature of learning and knowledge acquisition, and bring us to think in concrete terms about ways in which contexts of professional learning can at best enable apprenticeship learning.

This chapter is divided in five sections. In the first, I set the scene with an illustration of an apprenticeship in the professions, the learning of the use of the stethoscope by medical students, as described by an anthropologist. The second part reflects on some of the origins of the renewed interest in apprenticeship as a model of learning in the social sciences; I explore some of the paradigm shifts and ideas linked to the interest in this form of learning. The third section introduces the influential ideas of Lave and Wenger, their concepts of ‘legitimate peripheral participation’ and ‘communities of practice;’ whilst the fourth section casts a critical eye on these ideas, and reflects on the place of individuals in communities of practice, and potential for learning beyond the boundaries of a given workplace. In the fifth section, I look more in detail at the relationship between mind and body in apprenticeships, introducing ideas from the philosophy of phenomenology to reflect on the relationship between mentors and trainees in contexts of apprenticeship. I then turn to reflect on how employers can develop a pedagogy for apprenticeship in the workplace. Although mainly theoretical, this chapter will focus on examples from the literature that have addressed learning in the professions. I place particular emphasis on medical learning since this can uniquely highlight the value of apprenticeship-like ways of learning in the professions. I start with an example drawn from the apprenticeship of medical students as a way of illustrating the core ideas presented in this chapter.

28.2 Learning to Listen in the Medical Professions

The anthropologist Tom Rice (2008, 2010; Rice and Coltart 2004) carried out his field research among aspiring doctors in a London hospital; in a fascinating account, he describes his involvement in learning to use the stethoscope, together with fellow medical students, to listen to and identify heart murmurs. Led by Dr Coltart, a charismatic doctor convinced of the importance of developing auscultation skills, students practice by listening to the heart beats of patients with known heart murmurs, listen to CD recordings to learn to identify different types of murmurs, and are guided by Dr Coltart in their apprenticeship. Upon putting on the stethoscope, the student is immersed in an unfamiliar universe of noises. Only with time, practice and dedication will the student identify the ‘useful’ sounds and separate them from the ambient noise of the human body, and be able, eventually, to distinguish between different types of heart murmurs. Their mentor has recourse to a number of techniques to help them in this endeavour. He starts by sketching sound waves on paper, as visual representations meant to help the students identify certain significant sounds. Words are used to convey the approximate sounds of the beating heart: ‘lub dub’ are the nonsensical words used by doctors to describe the two main sounds of the heart. The word ‘Kentucky’ is used to identify the signature sound of a particular heart murmur. In the end, the exercise is a solitary one, students have no precise means to convey what they are hearing, nor to know whether the sounds they are hearing are real or imagined, or what they are ‘supposed’ to hear.

Although the process of learning to listen to the heart is not identified as an ‘apprenticeship’ by the students, many of the characteristics of the process of learning described by Rice resemble a typical craft apprenticeship. When learning to use the stethoscope, and in contrast to the formal preclinical education of doctors, students receive no clear guidelines. The students are learning to develop their sense of hearing; as Rice notes, Western cultures and languages are notably poor at describing sounds, arguably in contrast to other cultures in which the sense of hearing is privileged. In superficial terms, one can identify apprenticeship in this example in the relationship between a mentor and students, guiding rather than instructing, with limited reliance on theory, and with dependence on practice and ‘hands-on’ learning. The CDs used as practice by the medical students might represent the aspect of ‘formal’ learning; idealised recordings of the beating heart are followed by a voiced commentary of what the sound represents. Yet time and effort are needed for the student to bridge the gap between these ideal sounds and the noise coming through the stethoscope. Formal learning is inefficient in itself – and one might imagine (Rice hints to it) dispensable.

Several elements from this account set the frame of the discussion in this chapter. First and foremost is the relationship between a particularly ‘intimate’ learning experience and the social context in which it takes place. This element fits with the traditional characterisation of apprenticeship as learning through trial and error, and skills developed through practice. This relationship, as I will discuss, has proven to be particularly difficult to conceptualise: how are intimate, bodily skills, developed in a social world? The relationship between the individual students and the instructor is particularly salient, but Rice also tells us that students learn through interactions with each other. Another element that appears from this account is the particularity and specificity of the experience of the students. The practice of learning to use the stethoscope is grounded in a specific environment, that of the hospital. In contrast, schooling is at least thought of in terms of uniformity, the experience of school children is expected to be the same across a territory: the use of the same textbooks, school uniforms, and exams insure this illusion of uniformity. Theorising apprenticeship is theorising the particular. This makes the exercise particularly difficult – how does one theorise a type of learning experience that is defined by its particularity and variety?

Many accounts of medical learning could illustrate the apprenticeship-like learning in the clinical years of learning, but I find the example of students learning to listen to the heart brings out the issues particularly strikingly, notably as it shows the lack of efficiency of didactic methods of teaching in bringing students to acquire certain skills. I use this story to claim that apprenticeship is not only useful for ‘filling in the gaps’ of formal learning, it is also useful to get a feel of the distance between knowledge gained through didactic means, and knowledge gained in practice. The knowledge gained by the medical students is ‘personal knowledge’ (Polanyi 1962), it cannot be shared through words, and indeed the process of instruction is not one of ‘transmission of knowledge,’ but of guidance to a personal journey of discovery (Ingold 2000). Apprenticeship is not only (in its ‘traditional’ guise of craft apprenticeship) a description of a context of learning (master-apprentice, etc.),

but is also useful for rethinking central ideas and assumptions about human learning: the relationship between the mental and the bodily (in this example, the senses), the relationship between a learner and a mentor, and more generally, the relationship between an individual and a collectivity. In this form, apprenticeship can become a tool for thinking about learning, and can indeed become a paradigm of learning (Guile and Young 1998; Rainbird and Ainley 1999).

How did apprenticeship come to stand as a paradigm for learning? In the next section, I offer a brief historical sketch of the development of an interest in apprenticeship in the social sciences.

28.3 Rethinking Apprenticeship: From Institution to Model of Learning

The interest in apprenticeship as a model of learning in the social sciences stems from several interrelated traditions. I identify here four main intellectual sources of the renewal of interest in apprenticeship, and provide a brief account for each. This will help to understand the issues that are tied with the notion of apprenticeship as it is currently used in the literature. These four sources are: (1) the philosophical tradition of phenomenology and efforts at characterising human knowledge, (2) the social psychology of Lev Vygotsky and its interpretation in Western academia, (3) debates surrounding the presumed differences between formal and informal education, and (4) concerns in economic anthropology about the reproduction of relations of labour. What these approaches have in common is an interest in understanding the relationship between learning and the wider social and cultural context in which it takes place. The broader context for these arguments is the development of new paradigms in the social sciences, based on practice (Ortner 1984; Bourdieu 1977) and embodiment (Csordas 1990; Jackson 1983). Apprenticeship has proved to be a particularly useful model of learning, as it enables one to overcome some of the problematic dichotomies of classic “normative” models of knowledge and mind, premised on distinctions between mind and body (Palsson 1994). I briefly review these four origins of an interest in apprenticeship to convey the multiple meanings of the concept of apprenticeship as it is used today in academia.

Apprenticeship is usually characterised as ‘practical’ learning, and involving the learning of manual skills, and is often thought of in opposition to the mental learning of school (Sigaut 1993). For this reason, a focus on apprenticeship has resulted from a desire to better understand the development of bodily skills, notably in the context of changing academic interest in the body and its relationship to the world. What does it mean to ‘acquire’ a practical skill? This interest in skills has led scholars to think about skills in a broader way than simply ‘manual’ skills. The way one hears or sees, or even how one thinks abstractly, might also be thought in terms of skills. This approach owes much to the philosophy of Michael Polanyi (1962), and his notion of ‘tacit knowledge.’ In trying to elucidate the nature of scientific knowledge, Polanyi argued that even the most abstract knowledge involves a dimension of

personal knowledge, knowledge that is known intimately, is acquired in the same way as one acquires practical skills in the context of a craft apprenticeship, and cannot be rendered into words. A rejection of a normative view of learning, and the notion that all knowledge is representation and language-like (Ryle 2000; Bloch 1991; Ingold 2000; Marchand 2003) is central to the understanding of the nature of apprenticeship learning. More than a simple reflection on non-school learning, in this theoretical context apprenticeship has been put forward as a model of human learning in general (Rainbird and Ainley 1999; Lave and Wenger 1991). This approach to apprenticeship learning is also related to ideas of 'distributed cognition,' whereby cognition itself is not locked up in an individual's brain, but distributed in the physical and social environment (Lave 1988; Hutchins 1995).

An interest in apprenticeship, and more generally work-based learning, became central to the concerns of Western psychologists influenced by the writings of the Russian developmental psychologist Lev Vygotsky, although himself primarily interested in child learning. Expanding on the theories of Vygotsky, Barbara Rogoff (1990) used the concept of apprenticeship in thinking about the processes through which children acquire knowledge of the world, not simply through the acquisition of memories, percepts and skills, but by actively exploring the world around them, solving problems and remembering. Rogoff refers to Vygotsky and his colleagues and their belief of the 'seamlessness of individual, social and historical (or cultural) processes' (13). In opposition to the emphasis placed on language in the writings of Vygotsky, Rogoff emphasises tacit ways of learning about the world. Rogoff borrows the concept, central to Vygotsky's psychology, of 'zone of proximal development' (ZPD), the idea that most of the child's development takes place through processes of problem-solving that are slightly beyond the competence of the child, but facilitated through the guidance of a more skilled partner (Vygotsky 1978; Wertsch 1985). The concept was further developed into the concept of 'scaffolding' (Bruner et al. 1976), which is the process by which adults structure the activities of children in order to bring them to solve complex problems beyond their reach. Why is this interesting for apprenticeship? It is important to think about the way apprentices learn, not through instruction or transfer of knowledge but through guidance of the apprentice's exploration of the world (Ingold 2000). The approach of Vygotsky and Rogoff, among others, also highlights the agency of the learner, as opposed to the teacher, in acquiring knowledge. As the anthropologists Bambi Schieffelin and Elinor Ochs argue, in their study of the acquisition of language skills by children, 'the child or the novice (in the case of older individuals) is not a passive recipient of sociocultural knowledge but rather an active contributor to the meaning and outcome of interactions with other members of a social group' (Schieffelin and Ochs 1986: 165).

In attempting to understand the particularities of so-called 'formal' learning, debates in psychology and educational sciences strived to understand the particularities of what was (questionably) termed 'informal' or 'non-formal' learning (Scribner and Cole 1973, 1978; Lave 1977, 1982). These labels identified primarily the kind of learning a child undergoes in the family and community, with no defined curriculum, and in which learning is embedded in activities at hand. Understanding

such ‘informal’ learning was of particular interest to anthropologists, who studied societies which did not have schooling systems (Middleton 1970). Apprenticeship, all too often thought about in terms of opposition to schooling (Sigaut 1993), was also identified as a kind of informal learning resembling the learning processes of children in the family: it is embedded in the social context in which it takes place, is seldom didactic, and relies minimally on speech as a means of instruction. The use of the negative (informal and *non*-formal) is particularly problematic as it obscures the characteristics of a number of contexts in which learning occurs (Billett 2002a). Arguably even, the abstract notion of ‘learning’ itself is tied to a school context – a school is a place where children *learn*, whatever learning actually means. Arguably, it is in fact ‘formal’ learning that proved to be the most problematic to define, especially the notion – central to the definition of formal learning – that it teaches ‘transferable skills.’ A major change in perspective on apprenticeship as a form of learning is brought by Jean Lave through a range of publications (1977, 1982, 1988, 1990, 2011). Lave set out to conduct field research among tailors in Liberia in the hope of carrying out experiments at the crossroads of anthropology and psychological research. Apprenticeship was defined as an appropriate ‘informal’ kind of learning, and she intended to test a number of theories relating to the notion of transference of skills. The tailors of Liberia had varying levels of schooling, and this provided an opportunity for Lave to test out whether schooled tailors were better able to use their arithmetic skills in novel situations – as the classic theory of formal learning predicted. Her surprise came when she found no significant difference between schooled and unschooled tailors in solving problems. It seemed that apprenticeship was as ‘capable’ of teaching transferable skills. Lave went on to review her initial assumptions about formal and informal learning, leading her to reject this dichotomy, and think of all learning as grounded or situated in a given context.

I end my list of origins of interest in apprenticeship with brief reference to the interest in the topic of apprenticeship on the part of anthropologists starting in the 1980s (e.g. Goody 1982b; Coy 1989b; Lancy 1980). With cases studies from a range of contexts of (mainly craft) apprenticeships, this literature, inspired by Marxist ideas about modes of production, reflects on the embeddedness of apprenticeship as form of education in the societies in which they are carried out, and the complex roles of mentors and students. David Lancy for instance (1980) addresses the process of becoming a blacksmith in an area of Liberia. This, Lancy argues, involves more than the simple acquisition of skills, it requires the mastery of two other sub-roles, medicine-man and big-man, both essential for the blacksmith who has access to the private lives of people, and will have to travel and whilst doing so protect himself from sorcery. Mastery of each of these sub-roles involves different skills and each requires different training processes.

Taken together, these approaches point to the usefulness of the concept of apprenticeship as a model of learning, encompassing many facets of the experience of learning in such a setting. Is it still useful to think about apprenticeship given the range of contexts in which the term is applied? This is a debated question, with some, notably Jean Lave and Etienne Wenger (1991) arguing that the term has lost its usefulness. Yet the term has remained in the literature despite Lave and Wenger’s

arguments, perhaps as it continues to be useful in imagining a way of learning that has certain characteristics related to the learning of crafts, specifically that the knowledge acquired in an apprenticeship cannot fully be acquired verbally or textually, and that knowledge acquisition is dependent on immersion and personal involvement in a workplace and community.

28.4 Apprenticeship as ‘Legitimate Peripheral Participation’

What happens exactly during apprenticeship, and how can one conceptualise the learning process that takes place in such a context? Several elements need to be addressed in a discussion on apprenticeship learning: the relationship between body and mind in learning, the social nature of learning, and the embeddedness of learning in a social and physical environment among others. Given the difficulties in identifying exactly what apprenticeship is, some scholars have argued that the term ‘apprenticeship’ is, after all, not a useful one in that too many assumptions and stereotypes are linked with it. It is relevant for instance to ask why such a term should be applied to professional learning and learning at work. In the case I introduced this paper, one might admit that the medical students learn to a certain extent in the same way as in a craft apprenticeship: they have a mentor, they learn through practice, they learn with limited recourse to direct instruction. This is not to suggest a close relationship between the learning process of these medical students and craft apprenticeship, but rather to highlight certain features that are not commonly associated with formal, school learning. How then can one conceptualise apprenticeship learning as a tool to think about these specificities? Perhaps the most interesting attempt at redefining the notion of apprenticeship comes from the work of Jean Lave and Etienne Wenger. Lave and Wenger, in their seminal work *Situated Learning* (1991), introduce two central concepts that redefine our understanding not only of apprenticeship, but of learning in general: these are ‘legitimate peripheral participation,’ and ‘communities of practice.’ The approach of the two scholars has had an influence that is difficult to overestimate, and continues to define debates in a range of disciplines related to learning and education. I start by giving a short summary of their central ideas, before reflecting on the implications of their work, as well as some of its limitations. Lave and Wenger reject artificial dichotomies between forms of learning, in particular so-called ‘formal’ and ‘informal’ learning, and critique the common view of learning as ‘internalisation’ of knowledge. The work of Lave and Wenger is firmly rooted in the Vygotskian tradition of social psychology. It is also very much rooted in some of the concerns introduced earlier in this chapter: a questioning of the normative view of learning, and a concern with the wider social and political context in which learning takes place. Legitimate Peripheral Participation (LPP) and Communities of Practice (COP) bring together these concerns in a particularly elegant way.

The book starts by questioning the validity of the term ‘apprenticeship’ as applied to a range of learning contexts. A problem the authors identify in the literature is

that the two meanings of apprenticeship, in terms of an institution and as a mode of learning, tend to be conflated. They argue that we need a term that can take the insights derived from studies of apprenticeship, but can be extended to shed light on different domains of learning that are less obviously recognised as 'apprenticeships.' LPP is the position that individuals adopt as newcomers in a context in which they will begin a process of learning. This position is 'legitimate' insofar as 'old-timers' recognise them as valid participants in activities – for instance, in the context of a factory, new employees will be accepted as legitimate participants in work activities. These newcomers however remain 'peripheral' in that they are not yet full and autonomous participants in that new context. Gradually, as they participate in work or other activities, they become less peripheral, until they are recognised themselves as old-timers. This path from newcomer to old-timer might involve a range of technical knowledge acquired through participation and interaction with old-timers. In the example of the factory, the newly employed worker will learn the skills related to her activity, as well as, perhaps, a number of 'tricks of the trade' acquired through interaction with co-workers. But more than simple technical knowledge, for a newcomer to be fully accepted into the new activity context, he or she will develop an identity that is compatible with that of the group; this might involve a certain way of acting, talking, and mastering of activity-specific terms. For Lave and Wenger, learning involves much more than simple acquisition of technical skills: it involves a transformation of the person. Thus in redefining apprenticeship in terms of LPP, Lave and Wenger also redefine 'learning,' not simply in terms of individuals 'receiving' a body of knowledge, but in terms of the involvement of the whole person in a community of practitioners. Learning for Lave and Wenger is an 'integral part of generative social practice in the lived-world' (36).

The sister concept to LPP is 'communities of practice' (COP). A COP is not a community in the traditional sense of the term. What makes a community a community of practice is not simply co-residence or proximity, but is related to participation in common activities. Legitimate peripheral participants join communities of practice in which they strive to become full members, and adapt their identity to that of the other members of the community. Wenger et al. (2002: 4) propose a more precise definition of communities of practice: these are 'groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis ... Over time, they develop a unique perspective on their topic as well as a body of common knowledge, practices and approaches. They also develop personal relationships and established ways of interacting. They may even develop a common sense of identity. They become a community of practice.' In this definition, members of a community of practice need not be in daily contact or living in close proximity, but come together periodically to participate in discussions and problem-solving. Through the notion of COP, Lave and Wenger also put a different emphasis on the origins of learning. Rather than defining an apprenticeship or LPP in terms of a relationship between a master and apprentice, Lave and Wenger are putting into question the centrality of the master or expert as the single source of knowledge. Rather, Lave and Wenger propose a decentered view in which 'mastery resides not in the master

but in the organisation of the community of practice of which the master is a part' (94). As newcomers participate in the setting of a community of practice and forge an identity that is compatible with that of the group, they reproduce and transform the group as a whole. The use of the term 'legitimate peripheral participation' is intended to capture this double development, of 'knowledgeably skilled identities in practice and ... the reproduction and transformation of communities of practice' (1991: 55). Lave and Wenger use as an example the case of newcomers to the meetings of alcoholics anonymous. Although the AA meetings are not 'crafts' or an 'apprenticeship' in the traditional sense – they do not result in the making of things, or in the acquisition of work knowledge – the way they are organised suggests what Lave and Wenger conceive as defining characteristics of apprenticeship as model of learning: new members of the AA are accepted (legitimate) in a group comprising of old-timers as well as newcomers. Newcomers tend to at first remain silent, and observe and listen to (they are peripheral) the accounts of the 'old-timers' and general discussions. Gradually, they get a feel for the narrative conventions of the AA ('my name is X and I am an alcoholic'), eventually participating in progressively bolder ways until they have mastered the narrative genre of the meetings. This process involves, particularly evidently in the case of the AA meetings, a gradual formation of an identity as a 'practitioner' – in this case, an identity as a self-defined alcoholic that is consistent with that of the group and enables full participation.

Lave and Wenger's work has redefined apprenticeship to broaden its remit and extend it to a large number of contexts and situations, to liberate 'apprenticeship' from the centrality of a single expert, acknowledging the diffuse and complex ways through which knowledge is acquired, and refusing to separate the process of learning from the development of the person and formation of individual and group identities.

28.5 Communities of Practice and the Problem of 'Reproduction'

One of the criticisms that may be directed at Lave and Wenger's model is that it leads to a portrayal of communities of practice that are rather static. If the reproduction of communities of practice relies on the gradual absorption of peripheral participants, and if newcomers must learn to develop an identity that is compatible with that of the group, it is difficult to imagine how change can occur in such settings, and how new knowledge can be acquired. Scholars have addressed this problem in at least two ways, firstly by better acknowledging the contribution of individuals to communities of practice, and secondly highlighting the possibilities for critical reflection on existing knowledge in such communities.

What is the contribution of individuals to communities of practice? Stephen Billett (2009) cautions against a tendency in the recent literature on learning, including in the work of Lave and Wenger, to emphasise the social to the detriment of the individual in explaining processes of learning. He calls for more attention to the life

histories of individuals, as well as the ‘brute facts’ of their existence (relating to the maturation or abilities and disabilities of individuals) which ‘mediate how both the social and physical world are transformed, understood, engaged with, and learned from’ (34). For Billett, ‘it is the intersection between individuals’ personal history (itself a social product) and socially-determined vocational activities and goals embedded in particular circumstances (e.g. workplace, educational setting) that transforms individuals’ knowledge’ (Billett 1998: 256). Refocussing on the individual, for Billett, does not necessarily imply returning to an individualistic view of human learning, but rather focussing on the relational dimension of the social and individual. Particular instances of problem-solving by individuals might be explained with reference to the particular norms of a profession, or a specific community of practice, but also by the particular life-history of that person. In this view, one is better placed to reflect on the contributions of individuals in communities of practice, not simply in reproducing the existing structure of a community, but in bringing their own contributions derived from personal histories.

Recognising the contributions of individuals to communities of practice highlights the complexities of such communities, and points to ways in which changes can be introduced. Fuller et al. (2005) also call for a recognition of the complexities of such communities, and in particular of contemporary workplaces and to the institutional environments in which people work. These complex settings play a crucial role in the configuration of opportunities and barriers to learning that employees encounter. Based on their study of modern apprenticeships in British companies, Fuller and Unwin (1998, 2003) describe cases that do not fit well with Lave and Wenger’s categories. In particular, they point out that the categories of newcomers and old-timers, and of legitimate peripheral participant, are not always neatly defined. A newcomer to a workplace might for instance bring significant prior knowledge, from a formal educational setting or other workplace, which at times will place the newcomer in the place of a ‘teacher’ to the old-timers in a given workplace. For Fuller and Unwin, addressing this situation involves a better integration of formal and informal learning, something particularly important in contemporary contexts of work and learning, where limited time is available for apprenticeship as such, given the requirements of work, and continuous need of adaptation of skills to changes in the organisation of work and production. One might add that this is also particularly relevant in the context of professional learning given the centrality of higher education in the definition of the professions. Borrowing from Engeström’s notion of “expansive learning,” Fuller and Unwin propose ways in which formal learning and teaching can be at best implemented, not by reintroducing teachers as authoritarian and didactic, but by integrating theory in daily life, and making it relevant to ensure expansive learning. Teaching and participating in communities of practice need not be incompatible.

Yrjö Engeström (1987, 1991, 1996; Engeström and Sannino 2010), although generally accepting the arguments of Lave and Wenger, suggests that learning is about much more than simple integration in communities of practice. Learning also involves a new way of understanding the world, and progress through critical reflection on one’s own practices. What Engeström identifies as “expansive learning”

'learning in which the learners are involved in constructing and implementing a radically new, wider and more complex object and concept for their activity' (Engeström and Sannino 2010: 2). Yet in Lave and Wenger's model of learning through participation, little place is left for the creation of new knowledge, nor for transformation. Expansive learning is put forward as a multi-dimensional learning, that encompasses the "situational" perspective of Lave and Wenger, and transcends it by incorporating a dimension of innovation and change: 'learning is also criticism of the given, as well as innovation and creation of new ideas, artifacts and forms of practice' (Engeström 1994: 1). An illustration of the concept of expansive learning is put forward by Tara Fenwick (2004), in an effort to understand learning for 'portfolio professionals,' in other words professionals (in the study, nurses and educators) who are self-employed and offer their services to various organisations. The case studies are particularly interesting in that they put into question the notion of learning in communities of practice. Indeed, for self-employed professionals working on contract for different organisations, it is difficult to identify where such 'communities of practice' reside. For Fenwick, these professionals demonstrate 'innovative learning' in navigating the tensions and contradictions of their work as they move in and out of multiple communities of practice.

28.6 Learning Through the Mind and Body

How can one characterise the knowledge acquired through legitimate peripheral participation in communities of practice? I propose to explore this question with reference to the philosophy of phenomenology, and related ecological psychology. I have mentioned the influence of phenomenology on research in apprenticeship and the acquisition of skills. Social scientists, and in particular anthropologists, have become interested in apprenticeship as a way of approaching the place of the body and embodiment in processes of learning. A number of monograph length, as well as shorter studies, have been interested in this issue, and have been in particular influenced by the philosophy of phenomenology and embodiment (e.g. Marchand 2001; Downey 2005; Portisch 2010; O'Connor 2006). These works bring a complementary perspective on the issues that are of concern to Lave and Wenger. This literature has also questioned the normative view of learning that continues to be predominant in psychology; a focus on the body and embodiment has been put forward as a way of questioning persistent dichotomies between, notably, the mental and the bodily, as in the case of the medical students' apprenticeship of the use of the stethoscope I started this chapter with. Of interest here is not only providing a more refined understanding of bodily ways of learning and knowing in an apprenticeship, but also reflecting more in detail about the mind of the learner, and the relationship between a mentor and a trainee. Indeed, if in an apprenticeship much of the learning takes place through the body rather than through a solely intellectual engagement, how can a mentor guide and direct the learning process of a student?

One of the key concepts in the literature is that of ‘education of attention.’ But first, I turn to a discussion of a key term in that literature, ‘enskilment.’

Enskilment (Palsson 1994; Ingold 2000) is a concept that proposes that skills, rather than representations, underpin human knowledge. It highlights the inseparability of mind and body in processes of knowledge creation. In this view, much if not all of our knowledge is learnt through the body. This is the case of knowledge derived from the senses; in Rice’s account of learning among medical students, the senses, and in this case hearing, is itself a kind of skill that needs to be developed. Thus more than abstract or propositional knowledge (knowledge that can be rendered into words), a dimension of learning in the medical professions involves learning through the body. Vision itself, far from its characterisation as disembodied and somehow ‘objective,’ is arguably also a sense that is shaped through experience, and skilled. This is the argument put forward by Cristina Grasseni (2004, 2007): seeing in a certain way is enskilled, the result of a process of learning, and a certain way of seeing is often acquired for a given activity or profession – a fact that Charles Goodwin has identified as ‘professional vision’ (1994). The sense of vision, for Grasseni, is ‘ductile, situated, contested and politically fraught means of situating oneself in a community of practice.’ (2007: 1–2). For Andreas Roepstorff (2007), the interpretation of brain scans by scientific experimenters in medical settings is by no means objective as the high technology involved would have one believe. The process of making sense of the coloured areas of a scan that light up on the screen is a feat of skilled vision on the part of experimenters that Roepstorff compares to skilful navigation. In a similar argument, it has been suggested (Snowden et al. 2000) that the capacity to perceive subtle but relevant features of an x-ray is developed by doctors which increases with practice. Here also, one might identify the skilling of the senses as a crucial dimension of many professions.

Enskilment is the outcome of apprenticeship-like learning: it refers not simply to the acquisition of technical skills in the context of mentor-student relations, but a diffuse attunement to the physical and social environment in which it develops. Beyond technical procedure, for instance, cooperation in a community of practice has been identified in terms of enskilment: the anthropologist Gisli Palsson (1994) reflects on the capacities for cooperation among Icelandic sailors. High levels of coordination are required for successful sailing of fishing ships, and Palsson finds that the notion of enskilment is useful to describe in a non-reductive manner the way in which sailors adapt to the physical and social environment of the ship. Coordination of one’s bodily movements and the actions of others and mutual attentiveness are the result of collective enskilment, and are essential for efficient team-work and synchronisation of tasks. Silence on board of these ships is the indication that cooperation is at work and that sailors are sufficiently attuned to one-another to carry out coordinated tasks efficiently.

The concept of enskilment is thus particularly useful in thinking in broader terms of the skills acquired in the context of an apprenticeship. It is a perspective that does away with traditional divisions between mind and body – enskilment encompasses the bodily skills required for a task, as well as attunement to the environment, be it physical or social. An implication of the concept of enskilment is that knowledge is

not somehow locked in the head of the knower, but should be thought of as extended in the environment in which knowing occurs.

Apprenticeship learning is often stereotyped in terms of processes of 'reproduction' of skills. It is assumed that an apprentice learns to imitate and reproduce the procedures that the mentor has already mastered. In a normative view of learning, which rests on assumptions about transmission of knowledge which is linear, mental and language-like, this process of 'reproduction' might not appear problematic. Yet many have questioned the centrality of words, or knowledge that is language-like in that it can be transmitted through words (Bloch 1991; Marchand 2003). Again, the example of the medical students is useful in reflecting on this aspect of learning. Rice (2010) highlights the fundamentally personal experience of learning to listen in auscultation. Once the student fits the earpieces of the stethoscope, she is enveloped in a world of sound; in Rice's own account of this experience, it is as if the body of the patient fills one's own head. The philosopher Michael Polanyi (1962) identifies this personal knowledge that is acquired as 'tacit knowledge,' as I have mentioned earlier in this chapter. Yet auscultation skills are learnt, through interactions with a mentor, as well as with peers. How can one solve the apparent paradox of a skill that is at once so personal, yet also acquired in a social setting?

The term 'education of attention' is put forward to solve such a conundrum. The phrase is developed by the anthropologist Tim Ingold (2000), borrowing from the writings of the ecological psychologist JJ Gibson (1979). Ingold sees learning as inseparable from the physical environment in which it takes place. For Ingold, a skill does not exist in itself, locked in the head of the practitioner, but rather is a state of attunement to materials and tools. Ingold illustrates his points with the weaving of string bags in Melanesia: the movements of the hands of practitioners are not learnt in the abstract, but always through use of materials – the strings and bag in formation. Making an object with skill is not the translation of pre-imagined form into an object, but a performance that involves continuous feedback from the object in formation. For Ingold, learning craft skills might involve observation and imitation, but he warns, 'the novice's observation of accomplished practitioners is not detached from, but grounded in, his own active, perceptual engagement with his surroundings. And the key to imitation lies in the intimate coordination of the movement of the novice's attention to others with his own bodily movement in the world. Through repeated practical trials, and guided by his observations, he gradually gets the 'feel' of things for himself – that is, he learns to fine-tune his own movements so as to achieve the rhythmic fluency of the accomplished practitioner' (2000: 353). For Ingold, 'the continuity of tradition in skilled practice is a function not of the transmission of rules and representations but of the coordination of perception and action' (351). In this framework, a mentor does not so much instruct the student, but directs the attention of the learner to relevant features in the environment. This is what Ingold defines as a process of 'education of attention.' In his study of the interpretation of brain scans by medical experimenters, Roepstorff (2007), following Ingold, proposes that the learning involved in interpreting scans is one of education of attention, and compares the process of analysis with the apprenticeship of a young boy learning navigation skills in Greenland: learning occurs as the father

points out features of the environment worth noticing for the boy to become a skilled navigator. In the same way, experimenters analysing brain scans need to learn to navigate the scans, interpreting coloured blobs and constructing narratives that can make sense of them. For Roepstorff, this is a social process, not only because it takes place in a social context, but because it is a process of creation of narratives that both can make sense of the images under scrutiny, and need to be acceptable to a community of scientists (a community of practice).

In craft apprenticeships, it is often stated that words play a minimal role in learning (Singleton 1989; Marchand 2007). Yet rather than thinking in exclusive terms, language can and does play an important role in apprenticeships. Still, it is important to define what words ‘do.’ Rather than thinking of the existence of verbal elaborations in the contexts of apprenticeship, one could rather suggest that processes of enskilment bear a special relationship with language, and words can be seen as serving a function of education of attention. In a study of the ‘apprenticeship’ of dentists, Weddle and Hollan (2010) analyse the use of words, not to convey abstract information, but rather serving as a ‘scaffolding’ to direct the actions of students, and for instance indicate gestures that are too subtle to be easily observable. One might say that words in this case also serve as attention-directing devices. In one example, in guiding the movements of dentistry students, the instructor suggests that the correct movement should be similar to that of turning a doorknob. ‘Doorknob’ becomes a means of directing the attention of the student to a certain movement too subtle to simply observe in the demonstrations of the teacher. Words then can be powerful tools in processes of education of attention. I would argue that the dichotomy between formal and non-formal, and between tacit and verbalised, learning processes is misleading. Words can complement action and demonstration, enable the novice to imagine correct performance (Sennett 2008: 179–193) and facilitate learning.

28.7 Developing a Workplace Pedagogy

What concrete steps can workplaces take to enhance the quality of apprenticeship-style learning?

Following the work of Lave and Wenger, one might argue that the situated nature of apprenticeship makes it resistant to rules and guidelines; apprentices often need little in terms of explicit instruction, and can progress from their position as newcomer to that of full participant through complex processes of observation, imitation and engagement with tasks. Vocations might have a set of norms in common to all practitioners, but at the level of the community of practice, ways of doing things, that are the result of the particular histories of that community and its members, are not easily transferable to other contexts (Billett 1998). Given that there is no transferability between settings, a ‘workplace pedagogy’ (Billett 2001, 2002b) is to be developed at the level of the community of practice, and respond to the needs of

employers and workers for transforming newcomers into full participants to the workplace as efficiently as possible.

How to develop a workplace pedagogy that responds to the needs of communities of practice and the legitimate peripheral participants that join them? Stephen Billett proposes that such a pedagogy should rest upon three bases: it should be attentive to (1) access to direct guidance from co-workers and mentors, (2) to access to the affordances, or informal situations, that are provided by the workplace and co-workers in daily work, and (3) to the agency of workers in engaging with the tasks to be learnt. I comment below on these three elements, based on Billett's discussion (2001, 2002b).

Although much can be learnt spontaneously through the non-formal participation of workers in the workplace, there are circumstances in which direct guidance is helpful or necessary in developing the skills of workers. This is the case when elements of knowledge are hidden from simple observation and their learning requires explicitness and direction from a mentor; when the goals and best-practices of an activity are not immediately apparent to the novice; and in the management of the sequence of tasks that the learner engages in. Demand for direct intervention by mentors and co-workers might be especially needed in the context of contemporary workplace learning, where the constantly changing nature of work and work-force mobility often mean that workers need to rapidly learn new skills (Fuller and Unwin 1998; Billett 2002b). Guidance can take the form of demonstrations (modelling), scaffolding, and bringing the novice to reflect on progress and performance. At times, what is not immediately apparent to the novice is not so much the procedure of the task, but its goals (Billett 2001: 110–12); guidance can thus provide a way for the novice to understand the aim of individual tasks, and understanding of best practices.

Guidance in the sequence of tasks, or the 'learning curriculum' (Lave 1990; Billett 2001, 2002b), deserves special mention. Jean Lave (1990) describes the different stages of learning that the apprentice tailors of Liberia progress through. Lave noticed that apprentices started their apprenticeship with the making of relatively simple garments, and progressed onto increasingly complex tasks, at each step introducing new elements. All tailors, by the end of their apprenticeship, had learnt to make all different types of garment, even if they later specialised in only certain types. With each step, the apprentice is given the opportunity to consider how previous tasks contribute to the current one. For instance, apprentices learn to sew before they learn how to cut fabric. There are economic considerations in this reversal of the usual progression in the work of tailors, who usually cut the fabric before they sew pieces together: the cost of a mistake is much higher at the stage of cutting costly fabrics, than at the time of sewing when a mistake can be easily undone. But also, the apprentice is given the chance to understand how pieces of cloth fit together which will later feed into their understanding of the way the fabric is to be cut. For Lave, this shows that the learning curriculum in an apprenticeship is different to a school curriculum. Rather than a set of specific procedures to be taught, the apprenticeship curriculum, such as the one of Liberian tailors, is more a set of landmarks for learners, tasks that when achieved satisfactorily allow the apprentice to move on to the next one.

The observation that apprentice tailors learn to sew before they learn to cut costly fabric indicates that progression through the learning curriculum not only implies movement from simple to more complicated tasks, but also from less to more critical and accountable tasks: ‘sequenced access to activities is that which moves from those where imperfect performance has negligible consequences through to activities that have high levels of criticality and where mistakes carry significant consequences’ (Billett 2002b: 32). One important task for mentors in their provision of direct guidance is to guide the learner through an appropriate curriculum, managing the progression from simple and less accountable, to complex and more accountable tasks; this implies evaluating what next task is most appropriate for the novice to engage with, monitoring progress in a specific task, and introducing the novice to the next task at appropriate moments (Billett 2001, 2002b). The role of mentors is one of guide, rather than instructor: they guide the attention of learners to salient features of the tasks, monitor progress, and suggest new tasks depending on the performance on previous tasks.

The second basis for a workplace pedagogy, for Billett, is recognition of the informal and situated learning opportunities of the workplace, or ‘workplace affordances.’ The workplace provides opportunities for learning, both in its physical environment – in the tools, instruments, and spatial arrangements – and in its social environment. For instance, the lunch break can be one of those informal opportunities where newcomers to the community of practice learn about the politics of the workplace, or the activities and progress of co-workers. What a workplace pedagogy can make explicit is not the content of these informal opportunities of learning, but rules and principles that enable access to such opportunities in order to influence the quality of learning. The question of access brings up the crucial question of politics of the workplace; there is arguably a close relationship between the dynamics of communities of practice, and creation of exclusion and distinctions (Gowlland 2012). Fuller and Unwin (1998, 2003) conducted a study of workplaces providing apprenticeship in the framework of the British Modern Apprenticeships. They note that, although all employers invited participation of newcomers, there were marked differences between workplaces in the provision of opportunities for learning. In some cases, apprentices were trained to work on limited tasks, learning a few routine tasks, for instance the operation of a limited range of machines, in other cases, employers brought learners to experience a range of different activities in the workplace. For Fuller and Unwin, apprenticeships in these firms were more or less expansive, as learners were provided, or not provided, with opportunities to move to different work situations, and learning new tasks. Although learning occurred in these different contexts, the knowledge gained through work differed markedly. Some of the main obstacles to expansion and optimal enskilment might be in the restricting of opportunities for learning. As Swanwick warns, in the case of medical learning, in the rise in managerialism and public accountability in medical professions, externally imposed topic-based curricula is being pushed at the detriment of the creation of ‘authentic communities of practice’ which hinders the progression of individuals from newcomers to old-timers (2005: 864).

The third element in Billett's workplace pedagogy is recognition of the agency of the individual worker, and engagement of individuals with the guidance of mentors and co-workers, and affordances of the workplace. For Billett, learning is not wholly situation determined, and depends on the proper engagement of individuals. The successes and failures of learning depend on the interactions between the (socially shaped) personal histories of individuals, and characteristics of the community of practice. It might be that the sharing of values and ethics between individuals and the communities of practice they join enables learning, although dissonance in such values can also arguably lead to learning (Billett 2002b: 38), including perhaps 'expansive learning.'

These three interdependent elements of a workplace pedagogy, provision of direct guidance in appropriate circumstances, access to opportunities for informal learning provided by the workplace, and proper engagement of individuals, represent for Billett the three key interdependent elements of a workplace pedagogy. Rather than being informed by principles of formal learning, these elements are consistent with the principles of apprenticeship learning I have enumerated above, its situated nature, reliance on the progression of newcomers to oldtimers in communities of practice, role of mentors as guides rather than instructors, and agency of the learner in the learning process involving both the development of technical skills and construction of an identity as practitioner.

28.8 Conclusion

I started the chapter with a temporary definition of apprenticeship, characterised in terms of a mostly non-didactic way of teaching and learning, grounded in a local context and dependent on participation of the learner in work-related activities, and an educational framework in which learners acquire technical skills, and develop worldviews, ethical engagement and moral values. It might be opportune to revise this definition in light of the discussion in this chapter. Apprenticeship can best be characterised in terms of movement, from position of peripheral, novice status, to full participant in a community of practice. This movement is successfully achieved through both provision of access to opportunities for learning, in the form of direct guidance and the informal learning afforded by the workplace, and engagement of individuals in the community of practice. Apprenticeship, as a result of this complex interaction between persons and workplaces, is itself complex, constituted not only by a range of technical skills, but the development on the part of learners of ways of engaging with a community; this notably involves the development and definition of an identity as a practitioner in a given community of practice.

Beyond the institution of apprenticeship, most strongly associated with Medieval guilds, apprenticeship can represent a powerful model to think about learning. In this chapter, my aim was to give a sense of the complexities involved in apprenticeship-like systems of learning. Too often, apprenticeship is reduced to a stereotypical image, such as a mode of learning by trial-and-error, through observation and

imitation, and practice. In that characterisation, a judgement of value is usually implied, between mindless apprenticeship and abstract and rational knowledge acquired in formal education. But apprenticeship learning is all but mindless, provided we rethink traditional assumptions and dichotomies between mind and body, practical and abstract knowledge, and the individual and collective. As Marchand stresses (2008), the knowledge acquired in an apprenticeship, which involves not simply acquisition of technical know-how but development of a worldview and moral principles, is hard-earned and should be recognised as such. It is most often unhelpful to define apprenticeship as a negative of schooling, or establishing a kind of hierarchy between ‘formal’ and ‘informal/non-formal’ learning. Understanding this complexity and hard-earned outcomes of apprenticeship can be the first step in a better and more informed implementation of apprenticeship as a model of learning in the professions. Although I have tried, for the purpose of analysis, to identify the constituent parts of an apprenticeship, the usefulness of apprenticeship as a model of learning is its resistance to deconstruction. The development of an identity as practitioner, as Lave and Wenger argue, is part and parcel of the process of learning. The mind and body are working as one in developing knowledge and enskilment that is derived through practice. Nor does the acquisition of skills happen in a void, but is grounded in a physical and social environment, and in parallel to a process of development of a person and identity as member of a group.

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Chapter 29

Implicit Knowledge and Work Performance

Britta Herbig and Andreas Müller

Abstract Implicit knowledge is quite a heterogeneous concept comprising different aspects and research areas, such as experiential knowledge, tacit knowledge or incidental learning paradigms. Starting with some examples for the phenomenon, the main concepts of this research with respect to professional practice are presented and an integrative definition of implicit knowledge is given. Subsequently, implicit knowledge as the base for individual professional performance is discussed. Its strengths, like being able to integrate large amounts of information, are weighted against pitfalls, like naïve but action-guiding theories. Against this background, a model for professional learning is proposed with recurrent cycles of knowledge explication, reflection, reintegration, and knowledge application. The next part focuses on group implicit knowledge and its relation to professional team performance. While building up a shared mental model of a task teams have to regulate their actions on the individual as well as on the team level. Thus, in work teams implicit knowledge has two facets: individual implicit knowledge that is difficult to assess for the regulation of a collective team task and individual explicit knowledge that is not communicated within the team. The latter might hinder coordination and regulation of team processes necessary for the successful accomplishment of complex tasks. The chapter concludes with organisational strategies for dealing with implicit knowledge and a caveat regarding implicit knowledge and its role in work performance especially in jobs with serious consequences and frequent critical incidents.

Keywords Implicit knowledge • Awareness • Work performance • Experience • Explication • Reflection • Mental models • Team work

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29.1 Introduction

‘I know one thing, that I know nothing’. This well-known saying by Socrates (about 469–399 B.C.) describes a part of his philosophy, namely, that virtue is equivalent to knowledge (in the sense of insight). Someone who knows what is right will or should do what is right. This rational understanding of ethics leads to the demand for self-awareness. Almost two and a half thousand years ago Socrates coined terms and concepts that are also relevant to this chapter. His description of knowledge seems to be closely connected to the modern term of explicit knowledge – a knowledge that is conscious and that a person can reflect in the sense of self-awareness. However, the notion that knowledge about the right things will lead to the right actions might be wrong. Nowadays psychological findings identified a second type of knowledge that might be phrased slightly differently as ‘I do not know what I know’ or as one of the most prominent philosophers in the area, Polanyi, phrased it ‘we can know more than we can tell’ (1966, p. 4). This type of knowledge is the central focus here: implicit knowledge. We will integrate some of the different concepts of implicit knowledge, show its relation to experience and performance, and outline positive and negative effects of implicit knowledge for on-going professional learning. Moreover, the chapter will extend the concept to the notion of team knowledge and a model and method for professional learning is proposed.

29.2 Implicit Knowledge – A Heterogeneous Concept

To elaborate what constitutes implicit knowledge necessitates delineating it, and advancing a definition that is comprehensive, captures its complexity, and sets out how these are grounded in relevant literature. That is what is progressed over the following three sections.

29.2.1 *The Phenomenon*

Implicit knowledge is a quite heterogeneous concept comprising a lot of different aspects and research areas, such as experiential knowledge, tacit knowledge, or implicit and incidental learning paradigms. To give the reader a first impression about the concept, we will start with some examples of implicit knowledge in professional practice that shows some of its most prominent features.

Kirsner and Speelman (1998) cite the first example: according to a rumour, a leading French cheese manufacturer developed a costly expert system to evaluate the ripeness of soft cheese. From the experts’ information it was concluded that the important variables to determine ripeness were the surface tension and the necessary pressure for denting the cheese. However, the implemented expert system

failed completely. Later on, it turned out that the actual important information was the olfactory impression that developed by the lesion of the cheese rind. This example demonstrates two of the most commonly mentioned features of implicit knowledge – the difficulty to verbalise this knowledge and its relation to action. The experts were able to access explicit knowledge about their expertise and to provide verbal reports based on that knowledge. However, the explicit knowledge they named provided false information despite the fact that they were experts in the task. The information that the experts actually used was not ‘open’ to review although they used it successfully for years.

A second example describes a property of implicit knowledge that is especially important in the workplace – the use and integration of diffuse sensory information. Carus et al. (1992) report instances of this type from the domain of Computerised Numerical Control (CNC) lathes. Due to occupational safety CNC lathes are completely enclosed; that is, only very little information, like sound, can get out. Nevertheless, workers who worked with the same CNC lathe for a long time were able to tell if something was wrong inside the machine. They brought the lathe to an emergency stop before a breakage of the tools occurred and this way they were able to prevent the cost of machine idleness. If asked about how they knew that there might be a problem, some workers said that the noise from the machine was somehow different, the vibrations were altered, or even that they had a bad feeling about the ‘touch’ of the processed material. These minimal sensory changes could not be perceived by an outsider. Moreover, the worker himself had difficulties naming the specific information configuration leading to the bad feeling. This example shows that the experience-based interpretation of diffuse sensory information is an important aspect of implicit knowledge.

Nonaka (1994) presents the example of the development of an innovative home bread-making machine by a large Japanese company that hints also at the importance of experience in implicit knowledge. The research and development (R & D) team of the Japanese company had the technical knowledge to build such a machine, but decided that they needed to know how to make delicious bread. A member of the team was sent as an apprentice to one of the best bakeries. While working with the master baker the team member noticed that he had a very particular method of stretching the dough while he kneaded it. This experience was shared with the R & D team and it was implemented into the bread-making machine. The machine became a great success. In this example sensory information plays an important part again but, moreover, it describes that actual experience is sometimes necessary to learn specific know-how that, in turn, may constitute implicit knowledge.

There are also examples that paint a different picture of the suitability of implicit knowledge (for an overview see Mandl and Gerstenmaier 2000): Nowadays, nearly everybody is aware of the risks of smoking, the potential consequences of an unhealthy lifestyle causing problems like heart disease, or the ways in which HIV can be contracted, but still people do smoke, eat too much fat, and do have unprotected sex. It seems like the common feature of these phenomena is a gap between the knowledge and the actual, subjective beliefs that people might non-consciously hold and act upon. These discrepancies between knowledge and action have their

basis in a different feature of implicit knowledge: its acquisition by implicit learning and experience.

Implicit learning can be characterised as a non-conscious process in which knowledge is acquired without the intention to learn something. Moreover, it is assumed that implicit learning is non selective; that is, all contingencies between different stimuli are stored (for an overview of implicit learning see Seger 1994). One potential reason for risky health behaviour is that subjective beliefs contain a low probability estimation regarding the risk of becoming ill (similar to the concept of ‘bounded rationality’, Simon 1955). However, implicit knowledge might add another explanation. Subjective beliefs, rooted in personal experience or learned implicitly, are difficult to overcome since in most cases they cannot be accessed consciously. That is, people will not be able to correct their notions because they are not aware of it. This represents the other side of the coin: Implicit knowledge is used although it is inadequate in certain situations because a person is not aware of the knowledge (e.g., Herbig et al. 2001; Herbig and Büssing 2004).

To sum up, the above presented examples give a first glimpse at the phenomenon of implicit knowledge. Although they are neither complete nor shared by all researchers or research directions, they comprise some of the most often mentioned features of implicit knowledge. These features are: the difficulty to put this type of knowledge into words due to a lack of consciousness; the importance of sensory information in implicit knowledge; its acquisition through concrete experience and the problem that implicit knowledge might contain erroneous or naïve theories. In the following sections, we will first give an integrated definition of implicit knowledge and then describe these features as well as research findings in more detail.

29.2.2 Integrated Definition of Implicit Knowledge

The previous examples showed that the concept of implicit knowledge is quite heterogeneous and even ‘enigmatic’ – reaching from the simplest way to learn to an explanation for the highest experts’ performance. For the remainder of this chapter we will use the following integrative definition of individual implicit knowledge. We hold that it contains those aspects that are best substantiated in research:

Implicit knowledge contains declarative as well as procedural knowledge (e.g., Lewicki 1986). It can have a complex structure (e.g., Berry and Broadbent 1988) and contains naïve, sometimes wrong, theories (e.g., Fischbein 1994). It is acquired and strengthened by concrete and sensuous experiences (Polanyi 1966). Its acquisition does not depend on attention or awareness (e.g., Reber 1997). Implicit knowledge is not consciously perceived as guiding one’s actions, i.e., it works below a subjective threshold (e.g., Dienes and Berry 1997). Implicit knowledge can become accessible to consciousness (Reber 1989) and can be changed through explication (e.g., Gaines and Shaw 1993).

This definition of implicit knowledge shows the very close relationship between implicit knowledge and action. First, as implicit knowledge is acquired in the course

of experience, action is its antecedence and a consequence of knowledge at the same time. Second, as the processes involved are not conscious or, more precisely, they are working below a subjective threshold, the contents of implicit knowledge are difficult to reflect. That is, although in specific situations measures of explicit knowledge may show adequate content, implicit knowledge can lead to contrary action. In the following sections, we will present some results from basic and applied research sustaining our definition of implicit knowledge as the basis for a model on how to deal with implicit knowledge in professional learning.

29.2.3 Basic Research: Automated Processes, Implicit, and Incidental Learning Paradigms

Although the effects of implicit knowledge are most conspicuous in applied contexts, the fundamentals for describing and understanding the phenomenon are based on cognitive psychology and its experimental research into implicit learning and automated processes. The most frequently used experimental paradigms are serial reaction time tasks (e.g., Willingham et al. 1989), artificial grammars (e.g., Reber 1989), and the control of dynamic systems (e.g., Berry and Broadbent 1988; for an overview see Seger 1994). The common denominator of these tasks is the implicit learning of artificial rules that should have no relation to knowledge from the ‘real’ life to ensure that the knowledge bases of the participating persons’ performance are comparable. As a vast amount of research has been conducted within these paradigms (for an overview see, e.g., Berry 1997; Kirsner et al. 1998), the following overview on findings is grouped according to the individual features of implicit knowledge (for an overview see also Büssing and Herbig 2003).

Firstly, implicit knowledge can be complex and might be inflexible. Complex knowledge comprises a great number of elements that have manifold connections. Undoubtedly, explicit knowledge can be complex, but for implicit knowledge contradictory research results exist. On the one hand, social cognition research shows that people are not able to name complex proportion rules for human faces but react to even the slightest aberration from these complex rules (e.g., Lewicki 1986). On the other hand, computer simulations of results from artificial grammar research imply that the participants’ performance can also be explained by the learning of simple letter pairs instead of complex rules (e.g., Ericsson and Smith 1991). By just looking at the participants’ performance, the acquired knowledge in this research could have either been quite complex or very simple. Hence, it is difficult to give a final assessment of the complexity of implicit knowledge. At least theoretically, implicit experiential knowledge, as relevant in professional learning, should be more complex than the knowledge investigated in cognitive psychology (Mathews 1997). Flexibility of knowledge describes two different aspects: first, the ability to transfer knowledge between different situations and areas, and second, the ability to combine and link different knowledge parts. Holyoak and Spellman (1993) characterise implicit knowledge as a complex structure that, at the same time, is inflexible

and difficult to transfer in their research Willingham et al. (1989) give an indication of the correctness of this assumption. In serial reaction time tasks, implicit learning was established by an above-chance detection of the underlying pattern. Participants who could also name the pattern reacted faster in subsequent performance than persons who 'only' applied implicit knowledge. Thus, a transfer of implicit knowledge into an explicit mode might be a necessary precondition for flexible use.

Unfortunately, cognitive research paradigms do not investigate such an explication of implicit knowledge as an active process. Rather, the only theory on this problem, by Karmiloff-Smith (1990), declares that a sufficient amount of implicit knowledge has to be acquired for it to become explicit and this leads to an automatic process called representational re-description. This means, well-learned and repeated implicit representations are continuously subjected to renewed descriptions until the knowledge structures show a higher flexibility and are accessible to consciousness and verbalisation. Newer theories based on neuronal network modelling on decision-making (e.g., Glöckner and Betsch 2008) argue differently. Only if automatic processes in a network cannot reach a consistent equilibrium, higher deliberate or 'explicit' processes are activated. That is, when persons in a certain (professional) domain have to make a decision and the activated network contains faulty information but still reaches a consistent conclusion, a transfer to an explicit mode will not happen (cf., Herbig and Glöckner 2009).

Secondly, implicit knowledge contains naïve, sometimes wrong theories. Developmental psychology adds this feature to our definition of implicit knowledge. Evolutionary speaking, implicit knowledge developed prior to 'higher' cognitive processes ('primacy of the implicit', Reber 1993); hence it contains a type of *naïve theory* of the world (Macrae and Bodenhausen 2000). In the course of individual development, this knowledge should be replaced by more adequate theories. However, this replacement does not always take place. Instead, implicit, naïve theories persevere independently alongside explicit theories and gain the upper hand in certain situations (e.g., Fischbein 1994; Sternberg 1995). Types of situations that might trigger implicit theories are, for example, situations that call for fast reactions or situations that contain similar but not identical boundary conditions as the implicit model. In developmental and pedagogical psychology the assumption holds that these implicit theories are mostly incorrect – they are seen as a deficit that has to be overcome (e.g., Clement 1994). However, research shows that even people, who were provided with plenty of evidence against their implicit theories, continued to use these theories especially in difficult situations. That is, implicit knowledge is very resistant to change even if opposing explicit knowledge exists (Weinert and Waldmann 1988).

In pedagogical psychology, there is a second approach to naïve implicit knowledge. This approach also anchors in the 'primacy of the implicit' but it does not accept implicit knowledge as inferior. It claims that consciousness developed relatively late in evolution, while sophisticated, unconscious, perceptive, and cognitive functions, i.e., implicit processes, existed a long time before. Against this background, it is proposed that implicit knowledge is represented in a general, abstract form. This form contains only little information on specific stimuli configurations

but stores the structural relations between stimuli. Reber (1993) argues that, in an extreme complex environment, the ability for abstraction has a high adaptive value and should, therefore, have developed very early in phylogenesis. This proposition suggests a high adaptability of implicit knowledge but research on this question – commonly conducted with patients who have experienced neurological insult or injury – remains inconclusive. Nevertheless, with this change in perspective from ‘problem implicit knowledge’ to ‘chance implicit knowledge’, pedagogical psychology uses implicit knowledge also in a constructive way. Catchwords here are ‘learning by doing’, ‘learning by osmosis’, ‘professional instinct’, or ‘intuition’.

Thirdly, acquisition of implicit knowledge does not depend on attention or awareness. Closely related to the concept of consciousness, implicit knowledge is believed to work without intention and awareness while explicit knowledge cannot be acquired or used without consciousness, awareness, or intent. At least theoretically, there seems to be little doubt that implicit learning may occur even when there are no conscious, reflective strategies to learn (Reber 1989); making the acquisition of implicit knowledge happen incidentally. This assumption is difficult to test empirically as in implicit learning research paradigms stimuli are nearly always at the forefront of participants’ attention. Only a few investigations have tried to bring about implicit learning under conditions of minimal attention, like, for example, research into implicit perception in which attention manipulations distract the awareness that something should be learned (e.g., MacLeod 1998). Findings indicate that for some types of tasks a mere exposure effect is sufficient to learn relations between stimuli whereas other types of tasks need a higher degree of attention (e.g., Greenwald 1992). Against the background that in the work performance context, implicit knowledge is bound to action (Polanyi 1966), which, in turn, needs a certain amount of attention itself, it is reasonable to assume that the acquisition and use of implicit knowledge does not need further awareness or attention.

Fourthly, implicit knowledge is not consciously perceived as guiding one’s actions. Regarding this characteristic of implicit knowledge, Dienes and Berry (1997) state that implicit knowledge works below a subjective threshold. A subjective threshold is defined by the level of discriminative answers for which persons state that they do no longer detect perceptual information, i.e., that they are just guessing, although they perform on an above chance level (e.g., Cheesman and Merikle 1984). Knowledge above a subjective threshold is conscious and can be defined as explicit knowledge. The focus of the argument by Dienes and Berry (1997) is, therefore, not the acquisition but the *use* of implicit knowledge and a more specific definition of the role of consciousness. With this argument, the following two important aspects of implicit knowledge are added. First, working below a subjective threshold does not exclude the possibility that the knowledge being learnt becomes conscious at other times. Second, it permits a conscious engagement in some kind of action even if using implicit knowledge. Working activities that are guided by experience (e.g., in case of persons working in a profession for a longer time) are especially subject to involvement of implicit knowledge in this sense. One interesting result in this context is that, regardless of the subjective threshold, people do have a kind of rudimentary meta-knowledge of their implicit knowledge.

When questioning participants about how much they trusted their answers in implicit tasks, they reported a higher trust in correct answers than in incorrect ones, although they claimed that they were just guessing (Chan 1992). This finding also highlights the possibility that implicit knowledge, working below a subjective threshold, might become conscious at other times.

Fifthly, implicit knowledge can become accessible to consciousness. An often-mentioned feature of implicit structures and processes is that they operate outside consciousness while explicit knowledge is always accessible to consciousness. However, this commonly used concept for contrasting the two modes of knowledge is problematic because two basically different points of view regarding implicit knowledge and consciousness (e.g., Berry 1997) exist. Both positions assume that implicit learning is an unconscious process, i.e., there is neither consciousness for the learning process nor has the learner an intention to learn. The ‘no-access’ position (e.g., Lewicki et al. 1997) claims that this unconsciously acquired knowledge remains inaccessible to consciousness, while the ‘possible-access’ position (e.g., Reber 1989) claims that implicitly learned knowledge does not necessarily remain unconscious. That is, implicit knowledge may be accessible to the consciousness. With regard to findings from the research paradigms of cognitive psychology the ‘no-access’ position can hardly be maintained: To control the effects of implicit learning in experiments, participants were asked to name underlying grammar rules (Reber 1989), models of complex systems (Sanderson 1989), or pattern rules (Hartman et al. 1989) respectively. At least some of the participants in the various studies were able to verbalise partially correct rules after trials of implicit learning. Therefore, there is some evidence for the ‘possible-access’ position, except for one important limitation: although most participants performed much better after the implicit learning phase, the verbalisation of assumed rules was rarely complete or completely correct. That is, implicit knowledge is not entirely unconscious but those aspects that are explicable do not reflect the whole implicitly acquired knowledge about a task.

In sum, this section outlined some of the basic research on implicit knowledge and learning and its consequences for an integrated definition of implicit knowledge. We showed that hardly any characteristic of implicit knowledge is uncontested in research and we pointed out the most probable features integrated in the definition, namely:

- Implicit knowledge can be complex
- Implicit knowledge can contain naïve, sometimes inadequate theories
- Acquisition of implicit knowledge is independent of attention or intention to learn
- Implicit knowledge works below a subjective threshold of awareness
- Implicit knowledge can become accessible to consciousness and might be explicable.

We also pointed out that implicit models have a great influence on our cognitive processes (Fischbein 1994). This influence is most probably rooted in their empirical origin. Implicit models correspond with our experience, while

theoretical interpretations are based on logical coherence. Therefore, at least under certain circumstances, empirical-based models have a greater impact on our thinking than conceptual models. With this notion experience is introduced as an important factor for implicit knowledge. Consequently, the chance for concrete experience is seen as an essential part of knowledge acquisition. This assumption is closely related to concepts from applied psychology that are outlined in the next section.

29.2.4 Applied Research: Experiential and Situational Knowledge

Applied theory and research is mostly concerned with one hitherto unmentioned definitional property: Implicit knowledge is acquired and strengthened by concrete and sensuous experiences. Although different theories on implicit knowledge in organisations exist (e.g., Baumard 1999; Dierkes et al. 2001; Nonaka and Takeuchi 1995; Sternberg and Horvath 1999) most of these theories are based on the work of Polanyi (1962, 1966) who was the first author to describe the phenomenon from a real life perspective. Polanyi's most basic notion on implicit or tacit knowledge is that implicit knowledge is difficult to verbalise and therefore difficult to exchange between individuals (Polanyi 1966). He proposes that the reason for this difficulty is that implicit knowledge is entrained in action or practice and that it is linked to concrete contexts. Implicit knowledge is developed through concrete sensory experience and the integration of various impressions into a holistic mental model of a situation. Based on findings from Gestalt psychology, Polanyi views the 'Gestalt', i.e., the mental model, as the result of an active moulding of experience. Through different steps of integration and interpretation, seemingly meaningless sensations and/or feelings are then translated into meaningful ones and transformed into experience. For example, stonemason apprentices learning to use a chisel might, at first, concentrate on the right way to hold the tool. In a next step, they might try to hit the stone accurately. Only with time the degree of pressure on the hand is registered and controlled by the effect made on the object. That is, the apprentices implicitly learn a meaningful relation between different sensations and aspects of the situation. Polanyi (1962) describes this learning as the understanding of complex entities and stresses the essential role of bodily and sensory perceptions in this process. The process of learning depends on a kind of perception in which information is seen in terms of the whole. The structure of implicit knowledge consists of a intertwined relation between information, parts, characteristics, and the focal whole, to which they are related by the mental act of integration. In terms of the example, first the stonemason apprentice concentrates on single parts (chisel, stone, and arm-swing) before the relation and sensory feedback between single parts become integrated in the focal work (e.g., the sculpturing of a headstone).

From the perspective of work psychology, implicit knowledge is mostly investigated in the context of work experience and therefore as an essential part of experiential knowledge (e.g., Olivera 2000). Exemplary catchwords for implicit knowledge are ‘flair for a material’ or an ‘intuitive grasp’ on intricate or difficult situations. The worker acquires this implicit knowledge individually through events happening while working (e.g., the CNC lathe example in Sect. 29.2.1). It is embedded in the working process, that is, it is learned implicitly in the course of action. Implicit knowledge is therefore bound to a person and a situation. This so-called experiential knowledge results in a specific performance in work situations that cannot be mastered solely by routine (Carus et al. 1992). A common characteristic of these types of work situations is that they are not completely describable in advance; hence they cannot be standardised and performance rules are not sufficient for mastering these situations. Moreover, implicit experiential knowledge is of utmost importance in situations in which a great number of different interrelated process parameters have to be manipulated or optimised (e.g., Martin 1995). Therefore, in contrast to findings from basic research in work psychology implicit knowledge is seen as complex, multi-dimensional, and very flexible knowledge.

There are other concepts defined in work psychology that relate in some way to implicit knowledge: ‘situated knowledge’ from a conceptualisation viewpoint, apprenticeship approaches, or the model of experience-guided working from the perspective of knowledge acquisition. Situated knowledge is defined as knowledge that is principally bound to a situation (Greeno 1998; Menzies 1998) and, therefore, to certain antecedence conditions in order to be put into action. That is, situated knowledge has a close relation to action only if the environmental surroundings are very similar to those in which the knowledge was acquired (Greeno et al. 1993). The same holds true for the verbalisation of situated knowledge; that is, situated knowledge can only be stated if very similar conditions to the acquisition situation exist. Hence, it shares a common denominator with implicit knowledge. Apprenticeship approaches and the model of experience-guided working are particularly relevant for implicit knowledge in professional learning and are outlined in the next section.

In this section, we presented approaches to implicit knowledge from an applied perspective. They paint a more favourable picture of implicit knowledge in action than basic research and add another important part to the definition of implicit knowledge: Implicit knowledge is acquired and strengthened by concrete and sensuous experiences. Other defining properties from basic research, like the difficulty to verbalise implicit knowledge, are also stressed by the presented applied approaches.

29.3 Implicit Knowledge in Professional Learning

To advance the concept of implicit knowledge to professional learning, in this section we will first present theories helpful to understand the acquisition of implicit learning in the work context – apprenticeship approaches and experience-guided working. Secondly, we point out the specific strengths and pitfalls of implicit

knowledge in professional practice. And finally, we propose a model on how to deal with implicit knowledge in professional training for and on the job.

29.3.1 Theories Related to Implicit Knowledge in Professional Learning

Two complementarily theories try to explain the acquisition of implicit knowledge in the work context: apprenticeship approaches are especially relevant in the beginning of professional learning, and the model of experience-guided working describes the ongoing learning in the course of professional development. As a way to acquire implicit knowledge, apprenticeship has been described in a multitude of contexts (e.g., Ainley and Rainbird 1999; Hay and Barab 2001; Rimann et al. 2000). These accounts can be divided into cognitive apprenticeship and apprenticeship in practical skills. Collins et al. (1989), who were the first to introduce the cognitive apprenticeship approach, differentiated between easily explicated knowledge about facts and implicit strategic knowledge from expert practice. Implicit strategic knowledge is difficult to explicate outside an authentic problem situation and, it is best imparted in a situated way as well as within the social exchange between experts. Models for this imparting of implicit knowledge are traditional crafts and their manual skills. The cognitive apprenticeship approach tries to transfer the use-oriented principles of knowledge imparting in manual skills to cognitive domains with complex problems.

Apprenticeship in practical skills commences with an apprentice observing an expert's actions. In cognitive apprenticeship this has to be supplemented by a verbal report of the expert about his cognitive processes and strategies in dealing with an authentic problem. The following steps in the knowledge acquisition process are quite similar for apprenticeships in practical skills and cognitive abilities. The learner gets the opportunity to deal with a problem/task by himself meanwhile an expert supports him through coaching and scaffolding. These measures of support are slowly faded according to the progress and experience of the learner. In using the acquired skills and knowledge for a variety of tasks and problems, learners gain implicit knowledge in the respective domain.

Complementary to these apprenticeship approaches, the model of experience-guided working (Carus et al. 1992) and the sub-concepts of subjectifying and objectifying action (Böhle and Milkau 1988) allow a description of the ongoing acquisition of implicit knowledge in working. The reference points in subjectifying action lie in concrete and unique qualities and variations, while in objectifying action universally valid and generalisable rules dominate. Whereas in subjectifying action emotions play an important role for the structuring of work, in objectifying action they are only subordinate or disturbing elements in the work process. As for the sensation of the actor in subjectifying action, perception happens by means of complex sensations and by movements of the whole body. Moreover, emotions are seen as an essential part of perception. For example, a nurse who enters a sick room

sees the patient, perceives the smell in the room, hears the patient's breathing, and in touching the patient might get information about the condition of skin, pulse, etc. This mass of sensory information may lead to the feeling that something is wrong with the patient, and it is upon this feeling that the nurse acts. In objectifying action, on the other hand, only single senses are employed for exact, objective perception and, again, emotions are viewed as a hazard for objective perception. Taking the same situation, a nurse who acts objectifying might only hear that the patient breathes shallowly and then uses a stethoscope to concentrate on hearing and to get an exact measure. Due to the feeling that something is wrong with the patient, a heightened emotional state is seen here as disruptive for the concentration needed to take the measurement. Both forms of action cannot be compensated for or replaced by each other since they achieve different things. In experience-guided working, a mutual entanglement and completion of these two forms is assumed.

Polanyi's theory on tacit knowledge (1962, 1966) and apprenticeship approaches show that experience is necessary when it comes to reacting flexibly and effectively to unpredictable, critical situations. In experience-guided working, experience is not only seen as a precondition for and a product of action but also as a process that can produce new patterns and insights at the moment of realising the gap between real and expected situational conditions (Carus et al. 1992). This perspective highlights how individuals actively deal with conditions of the environment during the course of experience development. The notion that experience is bound to the action process thus focuses not only on the subject of experience but also on the field of experience and the respective conditions of experience (Büssing et al. 2006). Against this background, we will show the strengths and pitfalls of implicit knowledge in professional performance in the next sections and, thereby, outline the importance of accessing implicit knowledge to reflect on this knowledge, change potentially faulty contents and reintegrate them anew in professional experience.

29.3.2 Strengths of Implicit Knowledge in Professional Performance

When identifying the strengths of implicit knowledge in professional performance it is helpful to consider expert performance. Although expertise is a quite heterogeneous concept, too, researchers agree that experts usually work faster, more precisely and efficiently and need less resources than novices (Sonnentag 2000; Spelman 1998). Differences between novices and experts are found above all in qualitative aspects – in the organisation of performance prerequisites for a flexible, situation- and goal-orientated use of resources as well as in meta-knowledge and strategies (Hacker 1992). Action-guiding mental models have a special position in this organisation of performance as they reduce the working memory load by compressing knowledge. Thereby, capacities to deal with complex characteristics of a situation are released. This concept of psychological models is quite similar to the term of

'holistic anticipation characteristics' in experience-guided working. That is, experts and experienced persons develop a holistic mental model about how a situation should look like which is then compared to the actual situation. This comparison uses a similarity principle rather than an identity principle, that is, it allows for mental simulations with several diffuse variables instead of comparisons with sharply defined variables. Therefore, holistic mental models and the use of a similarity principle are somewhere in between routine performance that bases on the automatic activation of scripts or schemas (cf. Schank and Abelson 1977) and explicit sequential problem-solving with high cognitive and time demands. The ability of experts to use a similarity principle based on implicit experiential knowledge might lead to outstanding performance in work situations that otherwise cannot be accomplished by routine and/or explicit knowledge. However, due to its 'implicitness' experts are often unable to verbalise their knowledge (e.g., Dreyfus and Dreyfus 1986; see also cheese example by Kirsner and Spelman 1998, Sect. 29.2.1). A vast amount of research shows that experts' implicit knowledge is able to integrate large amount of information, to use 'fuzzy' information, and to enable fast reactions in critical situations (cf. Ericsson et al. 2006). An example from an interview with an expert male nurse in our own research illustrates these aspects:

I had a female patient who had a hip dislocation that should be set. The patients get Dormicum™ that can ultimately cause respiratory arrest, and a specific antagonist. The problem, however, is that the antagonist has a substantially shorter half-life period...Her breathing was quite okay. However, I once again walked in her room and thought: 'I look for her again'. A colleague of mine had the same thought and we went into the room together...I was looking at her and saying: 'I don't like her looks. She is breathing but I cannot say what...' I thought: 'Oh god. Something isn't right'. Her blood pressure was okay, pulse was okay, the respiration rate was okay, oxygen saturation was okay...Everything was okay but something wasn't right. My colleague said: 'Better fetch the doctor.' We both had this little intuition. I went to the doctor telling him that the patient looked bad. 'Yes, I know, she got Dormicum' [the doctor said]. I said: 'I have seen many patients who got Dormicum but this one is different.' And the doctor still didn't react. [...] Within half an hour her condition became so bad that we had to take her to the Intensive Care Unit. That really got under my skin. [...] Both of us were standing at the bed and saying 'Something is not okay' though we couldn't concretise it. Her breathing was normal but something was wrong with the patient. We knew her for quite a while, because she had stayed in our ward for already 2 months. Maybe that's it, we better knew the circumstances. [...] This patient was sleeping as a result of the medicament, and yes, breathing, but I was on night shift the week before and saw her every night when she slept. And it was different – under this medication her sleep was different, and that might have been the decisive point. (Herbig et al. 2001, p. 689)

This example stresses the importance of experience, but also clearly shows the inability to verbalise implicit knowledge. Expertise and implicit knowledge are generated mainly in concrete (working) situations, that is, they are not abstractly imparted but acquired through concrete actions in relevant contexts (Myers and Davis 1993; Polanyi 1962, 1966). Therefore, in striving for a strengthening of implicit knowledge in professional development, practice in concrete and different working situations is of utmost importance. However, as the example shows, to communicate the learned knowledge there might also be the necessity to find ways to explicate the learned knowledge.

29.3.3 Pitfalls of Implicit Knowledge in Professional Performance

As concluded in the integrated definition from basic and applied research on implicit knowledge its contents are usually not reflected and examined and might contain naïve or even wrong theories. Moreover, these theories might sometimes exist alongside correct explicit knowledge and guide ones' action especially in critical situations where there isn't much time to think and reflect. We were able to observe these problems in our own research with experienced nurses (for the research design see e.g. Büssing et al. 2004a). For example, a simulated critical situation dealt with a patient who had a motorcycle accident and a veiled hypoglycaemia. The participating nurses had to prevent a hypoglycaemic shock. One of the hints given by the patient was that he said several times that he was very hungry. One of the experienced nurses, who had mentioned hunger as a relevant symptom for hypoglycaemia in a test of explicit knowledge administered 2 weeks earlier, ignored the patient's statement and the patient went into shock. The method for explicating implicit knowledge revealed the following: 'I didn't relate it to a medical reason...I was thinking it is always a good sign if somebody is hungry...because at that moment he can't feel too bad' (Büssing et al. 2004b, p. 119, transl.). In the same situation, the patient had a cold-sweat and was trembling as further hints for hypoglycaemia. Another experienced nurse, who was also able to name these symptoms in the test of explicit knowledge, nevertheless ignored the symptoms in the simulation and explicated them later on as 'normal'. A questioning of this statement revealed that the nurse already worked on a detoxication ward for several years where trembling and sweating were quite normal among the patient population (Büssing et al. 2002).

Both examples reveal the importance of experience in developing and maintaining implicit action-guiding knowledge. In the first case, an interview with the nurse revealed that 'hunger is a good sign' seemed to have developed early on in socialisation through statements of her parents. In the second case, the implicit knowledge clearly developed and/or was strengthened during the nurse's professional life on the detoxication ward.

In the following section we will propose a method for professional ongoing learning that can help to retain the strengths of implicit knowledge for dealing with working tasks while preventing the pitfalls of unreflected, wrong knowledge contents.

29.3.4 Method for Dealing with Implicit Knowledge in Professional Learning

The presented characteristics of implicit knowledge have implications for its successful development and use in professional practice and, in consequence, for individual professional performance. Implicit knowledge is acquired and strengthened

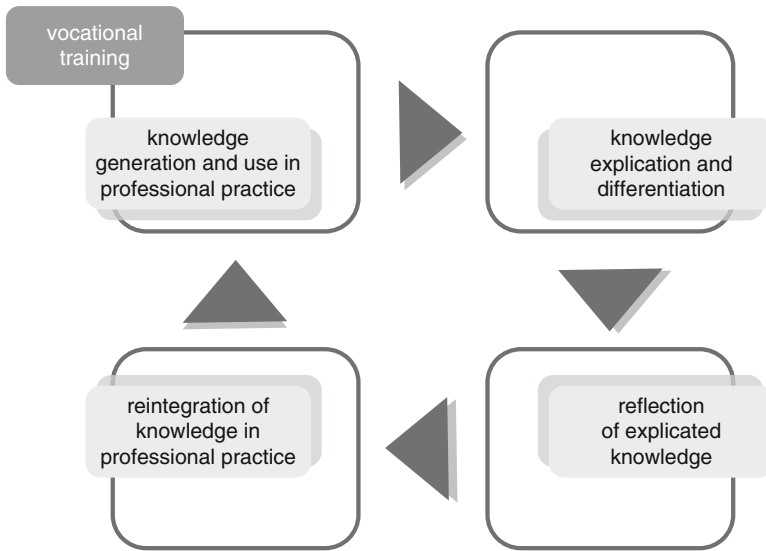


Fig. 29.1 Model for dealing with implicit knowledge in professional practice

by concrete and sensuous experiences in the respective profession and allows for adequate action in critical and/or ambiguous work situations. However, as it is processed below a subjective threshold, inadequate or even wrong implicit knowledge contents cannot be reflected and corrected. This, in turn, might lead to suboptimal professional performance. In order to circumvent such negative consequences in professional practice, we present a model for dealing with implicit knowledge in professional training. This training model consists of recurrent cycles of knowledge explication, reflection, reintegration, and knowledge application (see Fig. 29.1).

Starting with vocational training, a person begins to build up domain specific implicit knowledge in addition to his or her implicit 'naïve' knowledge of the world acquired earlier in development. In order for this domain specific knowledge to be adequate and relevant, a combination of explicit teaching and actual doing should be optimal, like for example, in the German dual education system where an apprenticeship in a company is combined with explicit learning in a vocational school. The closer both types of learning are linked to each other, e.g., by using experiences from the apprenticeship as learning content in vocational school and by testing explicit knowledge from vocational school during apprenticeship, the more adequate the acquired knowledge should be.

Once formal vocational training is completed, the use and generation of new knowledge continues in professional practice. However, without the potential benefit of linking new knowledge to explicit learning, the risk of acquiring 'wrong' or inflexible implicit knowledge increases. Therefore, two conditions should be met in order to build up adequate and useful implicit experiential knowledge: First,

professional practice should contain repetitive tasks and work conditions as well as new tasks; and second, specific feedback on work performance should be given as often as possible. The first prerequisite targets the importance of repeated dealing with similar stimuli to develop complex mental models for classes of situations. Such complex mental models allow for mental simulations with several diffuse variables instead of a simple comparison with sharply defined variables (similarity principle, see Sect. 29.3.2) and can lead to good or even expert performance. For example, the task of patient observation in nursing needs a lot of repetition in order to sense that something in a complex constellation of information is wrong (patient with DormicumTM – example). At the same time, having to perform new tasks highlights the learning of flexible knowledge by differentiating between boundary conditions so that the chance for using inadequate implicit knowledge in performance decreases. The second prerequisite, specific feedback – not just ‘well done’ or ‘you made a mistake’ – helps persons to become aware of their action-guiding knowledge, to reflect and, in the best case, to correct it.

However, as implicit learning usually happens incidentally and without intent, even under optimal conditions wrong knowledge is acquired. This knowledge needs to be targeted more directly. We propose that on-going learning in a profession should contain stages where implicit experiential knowledge is explicated and dealt with explicitly. This proposition is consistent with Polanyi’s (1966) reasoning that experience depends on two processes – integration and differentiation. Implicit learning is based on the integrative function; however, the perception of details and their differences is the most important task for a deeper understanding. Therefore, experience and, thus, adequate implicit knowledge should be built up by a constant change between integration and differentiation.

As implicit knowledge is embedded in action, an explication and differentiation can only happen if persons are confronted with their actions in situations that are likely to elicit implicit knowledge, like (time-) critical or ambiguous situations. Such a confrontation can be done ‘onsite’ by experts that observe the action of a worker and then challenge the person about their actions and knowledge. However, a better approach in the long run and an absolute necessity in high-risk jobs might be the simulation of critical situations (see Breckwoltd and Gruber in this section of the book). That is, persons have to deal with a realistic situation ‘offsite’ and their performance is videotaped. The video-confrontation allows the person to analyse his or her action and a ‘facilitator’ should help him or her to differentiate the employed knowledge.

The development of ecologically valid simulations of critical situations in which implicit knowledge and experience are likely to be of special importance might be one of the most challenging parts of our proposed model. It cannot be done without the help of experts in the respective professional area. Moreover, it might be helpful to define some criteria for the simulation and give these as guidelines to the experts for developing the situation in a reiterative process (similar to the Delphi-method by Linstone and Turoff 1975). Helpful criteria across different professions might be: Situations that contain time- and decision pressure; give ambiguous and/or diffuse information, and action consequences that are immediately observable.

However, when dealing with implicit knowledge it might be necessary to complement pure simulation approaches with knowledge elicitation techniques. In our own research, we used the repertory grid technique (Kelly 1969) to explicate knowledge used by participants in simulated nursing situations (e.g., Büssing et al. 2004a) and we would recommend this technique or similar approaches for knowledge elicitation in professional learning. As implicit knowledge is difficult to verbalise important elements of a simulated situation could be used as a starting point for explication. That is, after dealing with the simulated situation, a video-supported cued recall of the situation can be used as an approach by the ‘facilitator’: Persons are asked to name elements of the situation that were important for their actions. These elements are then further explored by means of a repertory grid procedure that allows a (re-) construction of underlying (implicit) relations between the elements by dichotic constructs (see Kelly 1969). In practice, after naming important elements, the persons are asked to compare each element with every other element and to answer the question whether they are similar or dissimilar. Then participants are asked to name this (dis)similarity and to rate every other element on this (dis)similarity dimension. At the end of the process, a fairly complete picture of the implicit mental model of the situation appears. By means of visualising the explicated knowledge (e.g., by correspondence analysis, Benzécri 1992) a validation of the contents of the implicit knowledge as well as an identification of problematic contents is possible.

This explication of knowledge takes quite some time. In viewing ones’ own actions and talking about it during the knowledge elicitation and identification, self-awareness is raised and a reflection process (e.g., Manning and Payne 1993) should start. This reflection process allows for a correction of inadequate knowledge or a clarifying of the boundary condition for the use of the knowledge. However, for this to happen, some prerequisites are necessary: On the organisation or company side that installs such a type of professional learning an error-tolerant culture is of utmost importance, so that participants do not have to fear negative evaluations. If they do, they will become defensive and no real reflection will take place. Similarly, a very high ability self-concept might impair this kind of learning. We found in our research that the experience of failure in a simulated critical situation reduced the ability to profit from knowledge explication in persons with such a high self-concept (Büssing et al. 2004a). A possible explanation is a threatening of the self-concept by the experience and, hence, also a defensive approach that impairs reflection and learning (see also Harteis and Bauer in this section of the book for learning through errors).

While the explication, reflection, and correction of implicit knowledge should normally happen ‘offsite’, a reintegration of the explicated knowledge (the integration function according to Polanyi 1966, see above) can only take place in professional ‘onsite’ practice. That is, for the differentiated and segmented knowledge parts to become a consistent mental model once again, which allows for fast reactions, more experience in dealing with the relevant situation is necessary. Against this background, organisations and companies should make sure that persons who obtained professional learning in the outlined form can use and consolidate their knowledge with the same or similar tasks for a period of time.

This overall training model of recurrent cycles of knowledge explication, reflection, reintegration, and knowledge application is similar to ‘deliberate practice’, a term coined by Ericsson et al. (1993) for the development of expert performance. With ‘deliberate practice’ it is assumed that mere rehearsal is not sufficient in order to achieve expert performances, but that conscious and arduous reorganisations of knowledge and practices are necessary to overcome performance plateaus. After a time of professional practice the proposed cycle for dealing with implicit knowledge should start anew.

In sum, this section proposed a model on dealing with implicit knowledge in professional practice. In form of a recurrent cycle, it outlined...

- conditions for the acquisition of adequate implicit knowledge (e.g., mixture of repetitive and new tasks, feedback);
- methods for the explication of implicit knowledge (e.g., critical situations, video confrontation, repertory grid);
- reflection of explicated knowledge and its boundary conditions (e.g., error-tolerant culture, self-concept);
- and conditions of knowledge application to regain the strength of implicit knowledge in professional practice.

29.4 Implicit Knowledge in and of Teams

In the final part of this chapter, we shift the focus to implicit knowledge in and of teams and its relation to team performance. Teamwork has become increasingly significant in recent years especially in solving complex and ill-defined work tasks (i.e., problems solving tasks). As an example, about 90 % of the critical situations within product development processes are solved in teams (Badke-Schaub et al. 2001; in Lindemann 2005). Following action theoretical approaches, teams can be understood as complex acting systems (Arrow et al. 2000; Tschan 2000; von Cranach et al. 1987, 1986), which have to regulate their actions on the individual level as well as on the level of the entire team. From this perspective, effective team coordination depends on every single team member developing an adequate understanding of common task goals, bringing his or her individual knowledge into the team process and combining these individual perspectives on the team level to form an adequate shared mental model of the task (e.g., Mohammed and Dumville, 2001). Thus, good team performance requires effective team coordination. Coordination losses are one of the reasons why, in a variety of tasks, factual team performance is often lower than the potential team performance that can be expected due to the capabilities of the single team members (Steiner 1972).

We suggest that implicit knowledge can provide a useful framework for understanding and improving team coordination. In accordance with the position of two-level team coordination, we distinguish between implicit knowledge *in* teams and implicit knowledge *of* teams (Müller et al. 2009).

29.4.1 *Implicit Knowledge in Teams*

Implicit knowledge *in* teams can be understood as the individual implicit knowledge of team members that is relevant to accomplish a team task. We expect a specific impact of individual implicit knowledge on team processes and vice versa: On the one hand, in problem-solving tasks particularly individual implicit knowledge that is not explicated, almost inevitably leads to process losses, because, for instance, individual differences about preferred methods cannot be recognised (cf. Putnam 1979, 1981). On the other hand, team processes impact individual implicit knowledge because problem-solving requires an open communication about task goals or joint action plans (cf. von Cranach et al. 1986; Tschan 2000). It can be assumed that such communication in teams holds a certain pressure on the team members to explicate their individual implicit knowledge (Hacker, personal communication) and fosters cycles of knowledge explication, reflection, reintegration, and knowledge application as introduced above. In permanent teams even a sort of transactive memory about who of the other team members ‘knows what or how’ might have been established (Wegner 1987, 1995). This happens when, in the course of team history, team members repeatedly observe implicitly driven procedures of another member (‘materialisation of individual implicit knowledge’) and assign this specific team member an expert status for this procedure, which then can be actively used in further group tasks. Permanent teams can, therefore, actively access individual knowledge of team members. In the case of ad hoc or temporal teams it is unlikely that a transactive memory can evolve. Thus, from the perspective of team mental models we can assume that in ad hoc or temporal teams it is more likely that individual implicit knowledge remains also team implicit. We can further conclude that in permanent teams individual implicit knowledge can become explicit team knowledge without individual explication.

29.4.2 *Implicit Knowledge of Teams*

In contrast, implicit knowledge *of* teams is individual explicit knowledge that is not communicated within the team. As such, implicit knowledge of teams has a slightly different quality than implicit knowledge in teams. Von Cranach et al. (1986) as well as Tschan (2000) stated that while individual activities are regulated by cognitions, team activities are regulated by communication. ‘We can postulate that while an individual has to think consciously, a team has to communicate’ (Tschan 2000, p. 59; translation by authors). In routine tasks, teams may act effectively without explicit coordination (Wittenbaum et al. 1996). As an example, an experienced crew can operate a transposition manoeuvre with a sailing ship without explicit coordination (von Cranach et al. 1986): Every crew member knows *what* they have to do, *how* they have to do it, and *when*. In other words, the team members already developed an adequate shared mental model of the common task, often referred to as inter-subjectivity.

However, particularly in the case of problem-solving tasks in teams, where goals are ill-defined and routine procedures are not available, the communicative development of a shared understanding of task goals and the joint deduction of action plans for accomplishing these task goals should benefit effective team coordination (cf. Cannon-Bowers et al. 1993; Hackman 1987; Hutchins 1991; Klimoski and Mohammed 1994; Mohammed and Dumville 2001). This is not a straightforward process, but one which is iterative with continuous goal development as well as adjustment of actions and procedures ‘on the way’. Referring to West (1996), we call the evaluation and reorganisation of explicated knowledge regarding team-goals ‘team reflection’. West (1996) reports promoting effects of team reflection in terms of communication of team activities and their continuous adjustment to process-goals on team performance. In one of our own studies with teams working on a product development task we implemented an intervention that was based on the above described repertory grid technique (Müller et al. 2009). The intervention aimed to support team reflection and a more explicit regulation of the problem-solving task. Results indicate that individual as well as collective explication enhanced the overall quality of developed solutions. The positive effects of collective explication were stronger than the effects of individual explication. As an additional example, systematic observations of problem-solving processes in teams indicate that teams develop better solutions when their communication incorporates systematic feedback loops between phases of goal-clarification and action-planning (Müller 2009). Similarly to the individual level, non-reflected action-guiding team knowledge can hinder the active and flexible development of goals and adaptation of procedures on the way.

There are several reasons why individual explicit knowledge remains implicit for teams: One reason is that it is not brought into the team process deliberately because of fear of personal devaluation, motivational deficits or strategic considerations (e.g., Wegge 2004). Another reason can be seen in the specifics of team communication. A great deal of studies shows that teams predominantly discuss the knowledge contents that are shared by all the team members (‘hidden profile’ paradigm, e.g., Stasser and Birchmeier 2003; Stasser and Titus 1985, 1987, 2003). Explicit team knowledge is closely associated with the cognitive diversity of teams. The larger the available amount of individual knowledge, the more likely is a high degree of cognitive diversity. Cognitive diversity increases divergent thinking, encourages the consideration of alternatives, and gives more careful thought to own viewpoints (Miliken et al. 2003; Smith 2003; see also West et al. 2004). Hence, cognitive diversity is likely to raise the innovativeness of a team (West et al. 2004).

29.4.3 Implicit Knowledge and Professional Learning in Teams

Within this theoretical framework, what are the practical conclusions for an effective dealing with implicit knowledge and professional practice-based learning in teams? One can conclude that, especially in ad-hoc teams that should jointly

accomplish problem-solving tasks, implicit knowledge in and of teams might negatively impact team processes. Thus, in such situations we recommend the application of measures that support the explicit regulation of team activities. In terms of team action regulation such measures should especially focus on the joint orientation of team members regarding the task goal respectively sub goals, the actions and procedures to achieve the task goal, and the *evaluation* of the goal achievement (cf. von Cranach et al. 1986; Tschan 2000).

Practically, during the process of joint problem-solving, teams should repeatedly clarify questions like the following three:

- What are the goals of our joint task? Does every team member have the same understanding about our joint task goals?
- When do we know that we have accomplished our joint task goals?
- Is what we are currently doing effective for the accomplishment of our joint task goals? If not, what should we change?

29.5 Conclusion

In dealing with implicit knowledge in professional practice-based learning, two quite opposing strategies are often favoured. Some companies demand the transfer of personnel every few years or even every few months in order to prevent ‘snugginess’ or becoming ‘stuck in routine’. Others (sometimes even the same companies) highly value the experience of their employees and use a type of (cognitive) apprenticeship system when a very experienced person is about to retire. That is, for a longer period of time an employee, who shall learn the experiential knowledge of the experienced person, accompanies the future retiree. In some cases, retirees are even brought back from retirement as the company fails to deal with certain tasks or problems without their experience.

These opposing strategies fit closely with the properties of implicit knowledge outlined in this chapter. The potential pitfalls, like inflexibility and inadequate content, give rise to the suspicion of being ‘stuck in routine’ or hindering effective team work. And the potential strengths, like being able to integrate large amount of information, use ‘fuzzy’ information, or to enable fast reactions in critical situations, give rise to the lauded side of dealing with tasks and problems in an expert way. As presented, both sides are warranted. However, with the outlined methods and models we digress from companies’ strategies in varying degrees. If implicit experiential knowledge of an employee should be saved for the company the apprenticeship system might be helpful. However, it would be better to help all employees to develop and acquire adequate implicit knowledge during their working life. Moreover, if the knowledge management of a firm is only interested in implicit knowledge shortly before an employee retires, it is possible that ‘faulty’ implicit knowledge is imparted to an apprentice. The policy of frequent transfer of personnel might be even more problematic. As it takes time to develop implicit experiential

knowledge, employees might never acquire meaningful mental models that lead to good or even outstanding performance. Additionally, having to deal with most tasks and situations explicitly might, in turn, lead to overstraining. Last but not least, teams that are working together for a longer period of time do not need as much time for communication about their implicit knowledge than ad-hoc teams.

Taken together, implicit knowledge in itself is neither a good nor a bad thing. In professional learning we should accept that whatever we do, we might ‘pick up’ knowledge we are not aware of but that nevertheless guides our actions under certain conditions. The main challenge for an effective dealing with this implicit knowledge in professional practice-based learning is, once in a while, to bring it into consciousness, examine and – if necessary – correct it. As to how often ‘once in a while’ is depends on the graveness of consequences that errors might cause in a profession and on the frequency of critical incidents: Both, serious consequences and frequent critical incidents should prompt employers to give their employees many opportunities to explicate and reflect their implicit knowledge.

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Chapter 30

Intuition in Professional and Practice-Based Learning

Eugene Sadler-Smith

Abstract Intuition is important across multiple domains of professional practice and warrants greater attention from researchers who are concerned with learning processes in professional and practice-based settings. Recent developments in the brain and behavioural sciences offer compelling conceptual and theoretical bases upon which models of intuitive ways of knowing may be integrated into the study of formal and informal learning processes. The study of intuition has the potential to offer new insights into how professional and practice-based learning is achieved and how it may be leveraged more effectively in workplace settings. The focus of this chapter is the business management occupational domain but much of what is discussed applies also to other domains of practice. The chapter: reviews the history of intuition research and its relevance for the practice of business and management; defines and theorizes intuition in terms of recent advances in the study of cognition from a dual-processing perspective; and examines the particular relevance of intuition for professional and practice-based learning in terms of ‘intuition-as-expertise’, relationships between insight and intuition, and individual differences in intuition as dimension of cognitive style. The chapter concludes by considering some of the methodological challenges for intuition research and the practical implications for professional and practice-based learning.

Keywords Expertise • Intuition • Learning

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30.1 Introduction

Various theoretical models are often called upon to provide descriptions, explanations and predictions of how adults learn both formally and informally in occupational settings and in professional practice (e.g. andragogical learning theory, experiential learning theory, social learning theories, action learning ‘theory’, situated learning theory, etc.). Although researchers who have studied these various phenomena have long-acknowledged the vital role played by tacit knowledge in human learning and performance, intuition is one aspect of learning which has been somewhat overlooked. Nonetheless, intuition is important across multiple domains of professional practice, including education (e.g. Atkinson and Claxton 2000), nursing (e.g. Benner et al. 2009), emergency services and the armed forces (e.g. Klein 2003) and business and management (e.g. Sadler-Smith 2010). As such, it warrants greater attention from researchers who are concerned with learning processes in professional and practice-based settings.

Now is an opportune moment to consider intuition’s role given that recent developments offer compelling conceptual and theoretical bases upon which models of intuitive ways of knowing may be integrated into the study of formal and informal learning processes. Furthermore, the study of intuition has the potential to offer new insights into how professional and practice-based learning is achieved and how it may be leveraged more effectively in workplace settings. It is the purpose of this chapter to offer a historically-based overview of the concept of intuition and examine its relevance for both professional and practice-based learning. The occupational domain within which these discussions are situated is primarily that of business and management, but it would be surprising if much of what is argued did not apply equally to other domains of practice.

In pursuing this purpose, the chapter: (1) reviews briefly the history of intuition research and its relevance for the practice of business and management; (2) defines and theorizes intuition in terms of recent advances in the study of cognition from a dual-processing perspective; (3) examines the particular relevance of intuition for professional and practice-based learning in terms of three issues: ‘intuition-as-expertise’; the relationships between insight and intuition as they pertain to creative problem solving; and the significance of individual differences in intuition as a style of information processing. The practical implications of these discussions for learning in environments that support and enable professional and practice-based learning will be considered.

30.2 Intuition: History and Relevance in Business and Management Practice

After many decades as a ‘Cinderella’ topic confined to the fringes of psychology and management and organization studies, intuition has of late “truly come of age” in the behavioural sciences (Hodgkinson et al. 2008, p. 1). In looking

retrospectively from the high-ground occupied currently a number of key themes and seminal contributions stand out in the intellectual trajectory which leads to our current understandings of intuition and its role in management practice. By way of contextualization these will now be summarized briefly in approximate chronological sequence.

30.2.1 Chester Barnard: Logical and Non-logical Mental Processes in Management

Chester I. Barnard (1886–1961) was a professional manager. He practised for nearly 40 years in the American Telegraph and Telephone Company (AT&T), where he began his career as an employee in the Statistical Department. He rose eventually to the presidency of the New Jersey Bell Telephone Company. As well as being a manager himself, Barnard also reflected deeply upon and wrote insightfully about his professional experiences and offered provocative views on the practice of management. His magnum opus is *The Functions of the Executive* first published by Harvard University Press in 1938 and, remarkably, still in-print to this day.

The most important and indeed foundational portion of Barnard's book as far as intuition research is concerned is the Appendix which is based on a lecture he gave on March 10th, 1936 to the Engineering Faculty and Students at Princeton University. The lecture was entitled 'The Mind in Everyday Affairs' and in it Barnard distinguished between two fundamental types of mental processes which he termed 'logical' and 'non-logical'. He described logical mental processes as conscious, expressible in words or other symbols and highly evident in the work, for example, of the "exact scientist" but not in the high-pressure tasks which often characterize the work of "businessmen [*sic*] or executives" (Barnard 1938/1968, p. 302). Non-logical mental processes on the other hand are inherently incapable of being expressed in words because they are unconscious, complex and rapid to the extent that they cannot be analysed easily even by the person within whose brain they take place. He attributed their source to knowledge acquired non-consciously or without conscious effort and which give rise to intuitions (described as "the handling of a mass of experience or a complex of abstractions in a flash") via a process whose "very vagueness shields it from critical scrutiny" (Barnard 1938/1968, p. 306).

Barnard argued that slow, deliberative, logical reasoning processes may actually be disadvantageous for senior managers in certain situations if they are not combined with good intuition. This is because the practice of management often requires decisions to be made quickly on-the-spot and in-action with little time for deliberation. The fact that Barnard was a professional manager adds weight to, rather than detracts from, his 'common sense' observations and insights about the significance of intuition; moreover they represent insights which apply not only to management but to professional practice more generally. In his writing Barnard presented a challenge to those members of the scientific management community who exhorted

an exclusive reliance on analytical reasoning processes, and he offered a plea for intuition (the ‘non-logical’) and rationality (the ‘logical’) to be placed on an equal footing in the analysis of managerial work (Sadler-Smith 2008, p. 45).

30.2.2 *Herbert Simon: Intuition as ‘Analyses-Frozen-into-Habit’*

There are parallels and continuities between Barnard and Nobel laureate Herbert A. Simon (1916–2001) to the extent that in his writings Simon also highlighted the limits of logic and rationality in decision making. One of his seminal contributions was the discovery that rationality is ‘bounded’ and that intuitions are grounded fundamentally in prior learning and experiences even though they may be executed rapidly and involuntarily with little conscious awareness of the underlying cognitive and affective processes. One of the precepts of Simon’s argument was as follows: to be perfectly rational in real-world decision making is impossible because the search for complete information would need to go on indefinitely and the consequent demands upon the brain’s information processing capacity and resources and time would be insatiable, and hence impossible to fulfil. Simon, and others working at the time in the administrative sciences including James March, recognized that management practice can never be perfectly rational since managers’ choices are always exercised with respect to a limited, approximated, simplified and hence ‘boundedly rational’ model of reality.

Simon was troubled by some aspects of Barnard’s work because it did not give many clues as to the actual processes which underlie managerial decision making. One of Simon’s greatest insights in so far as intuition research is concerned is that he invoked explicitly the notion of expertise as a basis for the operation of intuition, indeed one of his most famous quotes is that: “Intuition and judgment – at least good judgment – are simply analyses frozen into habit and the capacity for rapid response through recognition” (Simon 1987, p. 63). Simon’s view of intuition as a ‘freezing into habit’ or ‘compression’ of prior knowledge, learning and experiences provided the foundations for the notion of ‘intuition-as-expertise’ (Sadler-Smith and Shefy 2004). This perspective has been encapsulated more recently as ‘intuitive expertise’ (Kahneman and Klein 2009) and helps to explain how experienced managers and other professionals are able to respond quickly, seemingly effortlessly and often accurately in complex, time-pressured and uncertain situations. It is important to note that neither Barnard or Simon were in any way passionate ‘advocates for intuition’ since in Simon’s theory, as was the case in Barnard’s writings, rationality and intuition are seen as complementary components of an effective decision-making approach to the extent that in management as well as professional practice more generally “the effective manager [practitioner] does not have the luxury of being able to choose between ‘analytic’ and ‘intuitive’ approaches to problems” (Simon 1987, p. 63).

30.2.3 *Mintzberg and Others: Intuition, ‘Neuromyths’ and Metaphors*

Ever since the days of phrenology (the pseudo-scientific study of the relationships between the morphology of the human skull and a person’s character) the question of ‘where’ in the human brain intuitive processing takes place has long-fascinated researchers, professionals and the public alike. During the mid-1970s ideas that emerged from the field of psycho-biology, most particularly in the experimental work of Nobel laureate Roger Sperry (1913–1994), regarding hemispheric specialization in the human brain (so-called ‘split-brain’ studies), were adapted and elaborated on by management researchers. Most notable amongst these was Henry Mintzberg who, in his famous *Harvard Business Review* article of 1976 entitled ‘Planning on the left, managing on the right’ declared that planning in business was a ‘left hemisphere [of the brain]’ process (i.e. logical, analytical, and verbal) while managing was a ‘right hemisphere’ process (i.e. creative, intuitive, and imagistic), moreover “which hemisphere of one’s brain is better developed may determine whether a person ought to be a planner or a manager” (Mintzberg 1976, p. 49). In doing so, he drew attention to the view that the professional practice of management was as much an ‘intuitive art’ as it was a ‘rational science’ (echoing similar lines of thought regarding professional practice more generally, exemplified for example in the work of scholars such Donald Schön).

The left-brain/right-brain distinction was embraced eagerly by others in management research, consulting and practice. For example in management research Taggart and colleagues proposed a ‘human information processing (HIP) metaphor’ in which a ‘left-hemisphere’ decision style was characterized by logical, sequential, objective, deductive, and analytic processes, whilst a ‘right-hemisphere’ decision style was characterized by non-logical, simultaneous, subjective, a-causal, inductive, and synthetic processes, including intuition (Taggart and Valenzi 1990). In the consulting arena, Ned Herrmann in *The whole brain business book: Which quadrant dominates you and your organization?* offered readers a ‘Whole Brain Technology’ that promised to make them more ‘whole-brained’ in both their professional and personal lives. Three decades after Mintzberg’s *Harvard Business Review* article, Daniel Pink in his *New York Times* best-seller *A whole new mind: Why right-brainers will rule the future* (translated into 23 languages and probably read by many busy professionals worldwide) challenged the orthodoxy of reductive and analytical forms of thinking (referred to as ‘L[i.e. ‘left-hemisphere’]-directed’) and argued for a new ‘R [right brain]-directed’ frame of mind (Pink 2005). The idea that ‘intuition-is-in-the-right-brain’ is possessed not only of a perennially popular appeal but is also remarkably resistant to being de-mythologized by recent scientific advances which offer a more complex and nuanced view of intuitive information processing.

It may come as a surprise therefore to learn that as far back as the late 1980s no less a figure than Simon himself referred to the split-brain doctrine in management as a “romantic extrapolation” (Simon 1987, p. 58), and in the same year Hines concluded that it represented a “hemisphere mythology” (Hines 1987, p. 600). These critiques

are amplified by recent research in cognitive neuroscience which has demonstrated that a considerable gulf exists between current scientific understandings of learning and the brain and the popular applications of neuroscience in teaching and learning (Goswami 2006). Viewed sympathetically the ‘split-brain’ idea is at best a convenient metaphor for two different modes of thinking since, as we shall see, the left-brain/right-brain model of analytical/intuitive thinking has given way to more sophisticated ‘neural geographies’ in which intuitive and analytical approaches to decision making are underpinned by complex, interconnected neuropsychological networks and systems (e.g. Lieberman 2007) truly understandable only by experts in the brain sciences. Hence, references to gross left-brain/right-brain differences in analysis/intuition and the locating of intuition in the ‘right brain’ are best-treated as metaphorical at most, but better perhaps “avoided altogether” (Hodgkinson et al. 2009a, p. 282). Learning and development programs which promise to make participants more ‘whole-brained’, whilst not exactly the ‘split brain-madness’ referred to by Finkel and Sabat (1984), might be approached with caution.

30.2.4 Agor, Parikh and Others: Descriptions of Intuition-in-Use

The 1980s saw a general awakening of interest of intuition in management practice with several influential articles on the subject published in practitioner journals such as *Harvard Business Review* (e.g. Isenberg 1984) and *Organizational Dynamics* (e.g. Agor 1986). Researchers and writers on this subject concerned themselves with questions relating to intuition’s role in managing organizations in what was seen to be an increasingly fast-paced, uncertain and complex business environment. Their goal was often prescriptive and largely a-theoretic, offering advice about when intuition should and should not be used in the pursuit of better management practice.

In the early 1980s, Weston H. Agor surveyed over 3,000 professional practitioners in the USA (his sample included CEOs, military commanders, college presidents, health managers and legal executives) and found senior executives to be more intuitive than middle level and lower level managers and females to be more intuitive than males (closer scrutiny of these claims and subsequent findings reveal gender differences in preferences for intuition in general to be so small as to be of little practical significance) as well as differences in terms of occupational specialism (e.g. human resources professionals were, perhaps not surprisingly, more intuitive than finance professionals). Agor also found that the most intuitive amongst the practitioners he surveyed (i.e. those in the top 10 %) used their intuition in situations of high uncertainty and where there was little previous precedent, where there were limited available facts and poorly understood cause-and-effect relationships, and where a number of plausible solutions exist but the amount of time available to take a decision was limited (cf. Barnard 1938).

Subsequent research also pursued a similarly descriptive line of inquiry. For example, Parikh et al. (1994) conducted an international survey of over a thousand

professional practitioners across nine countries which examined several aspects of intuitive judgment, including participants' perceptions of how relevant intuition was held to be in decision making for different areas of management practice. Intuition was reported by the participants to be most relevant in corporate strategy and planning (80 %), human resources (79 %), marketing (77 %), research and development (72 %) and least relevant, unsurprisingly, in finance (31 %) and production, operations and materials management (26 %). In the USA in the 1990s, Lisa Burke and Monica Miller interviewed professionals with 10 or more years' experience in several large organizations and found practitioners' use of intuition to be related primarily to experience (e.g. "Individuals look through [their] experiences in their 'central processing unit' [computer analogy] and make decisions based on their past experiences") and affect (e.g. "Sometimes I've a strange feeling that something about the claim isn't quite right and then I dig for more information and find that the facts weren't absolutely accurate as reported to me"). Their findings added to those of earlier researchers in echoing the fact that intuition was likely to be used in situations calling for people-oriented decisions, quick decisions, unexpected decisions, uncertain or novel situations, and contexts where there was a lack of explicit clues. Moreover it is interesting to note, especially in the light of the writings of Barnard and Simon, not only that the vast majority (nine tenths) of participants in Burke and Miller's study reported combining intuition with rational analysis when making decisions, but a significant majority (two thirds) reported that their use of intuition led to significantly better business decisions.

The theme which permeated intuition research up to the turn of this century was that in many situations within professional activities it is simply not possible for practitioners to explore in a rigorous, methodical and exhaustively analytical manner all the data that they are confronted with (indeed to do so might result in 'analysis paralysis'). Hence, an alternative explanation is needed for the fast, high-quality judgments which professionals often execute routinely in their day-to-day practice. Whilst the field of management appears to be the domain in which these issues have been explored most extensively, it is highly unlikely that intuition is any less important in other professions in which it is necessary to take decisions under conditions of uncertainty, complexity and time pressure. For example, patient care in medicine and involves "intuition, experience, and holistic perceptions in making clinical judgments" (Patel et al. 1999, p. 75).

30.2.5 Accounting for Affect: Insights from Somatic Marker Hypothesis and Dual Processing Theories

In the wake of the pioneering works of Barnard and Simon (which are seminal laid foundations for the study of intuition as a manifestation of expertise) and the descriptive phase of research initiated by Agor and others (which offered incontrovertible evidence of the practical significance of intuition in business and management), scholars began to probe more deeply into the phenomenon to understand its underlying cognitive and affective antecedents. In an article published in the

academic/practitioner journal *The Academy of Management Executive* entitled 'The Intuitive Executive: understanding and applying 'gut feel' in decision making' Sadler-Smith and Shefy (2004) conceptualized intuition in two distinct and complementary ways: 'intuition-as-expertise' and 'intuition-as-affect'. Their efforts were, in part, a response to a perceived shortcoming in Simon's theorizing of intuition, i.e. the lack of a compelling account for the role of affect in intuitive decision making (even though Simon in his 1987 *The Academy of Management Executive* article had discussed with some shortcomings the role of emotion, as opposed to intuitive affect, in decision making).

The problem was that the Simonian notion of 'intuition-as-expertise' offers only a partial view of a phenomenon (intuition) which has both cognitive and affective facets, indeed the subjective experience of intuition is by definition 'affectively-charged' to the extent that in common parlance it is often treated as synonymous with 'gut feel', 'hunch' or 'vibe'. One way of understanding and theorizing intuition-as-affect is from the combined perspectives of neuro-physiology and cognition as instantiated in the 'somatic marker hypothesis' (SMH).

The SMH was developed by the neurologists Antonio Damasio, Antoine Bechara and colleagues. In it they proposed a systems-level neuro-anatomical and cognitive framework for understanding and predicting the relationships between decision making behaviours and affect (Bechara and Damasio 2005). Based on a series of classic experiments that have become known as the 'Iowa Gambling Task' (IGT) these researchers (e.g. Bechara et al. 1997) compared the performance in a high-risk gambling task of 'normal' participants and patients with damage to various brain regions including the ventro-medial prefrontal cortex (VMPC) and amygdala (previous research and neurological cases such as that of Phineas Gage had suggested these brain regions might be involved in infusing emotion into cognition).

The IGT studies offered strong evidence that when the ventro-medial prefrontal cortex is intact autonomic responses associated with intuitions based upon previous experience and emotional states guide decision making and outcomes in advance of awareness and influence higher-order thinking processes both consciously and unconsciously (Bechara and Damasio 2005). In cases where the relevant brain regions happened to have suffered damage as a result of lesion or disease the regulatory function of the system is impaired and participants lack the ability "to generate these emotional signals, [and] patients fail to avoid the decks [of cards in the IGT] that lead to painful losses and, instead, they sample the wrong decks until they go broke in a manner that is very similar to how they behave in real life." (Bechara and Damasio 2005, p. 346).

Damasio and colleagues tended to focus on the negative outcomes of decision choices, arguing that one of the roles of physiological somatic markers is to force attention on undesirable potential outcomes that may accrue from certain actions. Taking this proposition a step further, Sadler-Smith (2008) proposed that 'gut feelings' may have evolved through natural selection to err on the side of caution and, hence, serve as an adaption for the avoidance of potential high-risk situations. Applying this idea to professional decision-making situations, the intuitive affect (e.g. gut feeling) which is an outcome of the process of intuiting may aid in the

Table 30.1 Attributes of System 1/System 2, experiential/rational and reflexive/reflective processing

Source	Attributes	Attributes
Evans (2008)	<i>System 1</i> Unconscious; Implicit; Automatic; Low effort; Rapid; High capacity; Default; Holistic Associative; Domain specific; Contextualized; Parallel Independent of general intelligence	<i>System 2</i> Conscious; Explicit; Controlled; High effort; Slow; Low capacity; Inhibitory; Analytic Rule based; Domain general; Abstract; Sequential Linked to general intelligence
Epstein (1994)	<i>Experiential system</i> Holistic; Automatic, Effortless; Affective; Associationistic connections; Behavior mediated by ‘vibes’; Encodes in concrete images, metaphors, narratives; Rapid processing; More resistant to change	<i>Rational system</i> Analytic; Intentional; Effortful; Rational; Logical connections; Behavior mediated by conscious appraisal; Encodes in abstract symbols, words, numbers; Slower processing; Less resistant to change
Lieberman (2007)	<i>Reflexive processing (X-system)</i> Parallel processing; Faster operating; Slower learning; Non-reflective consciousness; Spontaneous; Sensory; Unaffected by cognitive load; Phylogenetically older	<i>Reflective processing (C-system)</i> Serial processing; Slower operating; Fast learning; Reflective consciousness; Intentional; Linguistic; Affected by cognitive load; Phylogenetically newer

selection of alternatives in complex, uncertain and time-pressured situations “by quickly and covertly sifting through fine details and providing feelings-based signals for or against a course of action” (Sadler-Smith and Shefy 2004, p. 84). For a critical review of the SMH see Dunn et al. (2006).

The foregoing discussions suggest that intuitions have both a cognitive component (i.e. they are based on the higher-order processing of complex patterns of cues which have become ‘automated’ over time to the extent that they are both non-conscious and rapidly executable) and an affective component (i.e. they involve an infusion of affect that is distinct from an emotional response and which biases decision choices on the basis of a somatically generated assessment of the potential risks involved). These two fundamental insights regarding intuitive processing raise an important question about how such mechanisms may be *jointly* theorized. Dual processing theories provide a broad conceptual architecture which may be used to account for these various automatic/controlled and affective/cognitive facets of intuition. Dual-process theories, which are paradigmatic in a number of sub-disciplines of psychology, have been summarized cogently by Evans (2003, p. 454) as essentially positing “two minds in one brain”, they come in a number of forms (see Evans 2008; Stanovich and West 2000) and have in common the notion that there are two contrasting modes (systems) of information processing: System 1 processes are contextually-dependent, automatic, largely unconscious, associative, intuitive, implicit, and fast; System 2 processes are contextually-independent, analytic, rule-based, explicit, and relatively slow (Stanovich and West 2000), see Table 30.1.

Among the many dual-process theories, Cognitive-Experiential Self-Theory (CEST) – first developed by Seymour Epstein in the early 1990s (Epstein 1994) – is especially pertinent to intuition research because of the primacy that it accords to intuitive affect. Cognitive-Experiential Self-Theory posits a ‘rational (i.e. analytical) system’ and an ‘experiential (i.e. intuitive) system’ (Epstein et al. 1996; Epstein 2008) which are qualitatively different, contextually dependent, and operate in parallel, see Table 30.1. The experiential system (categorized within System 1) has the following attributes: holistic; automatic; effortless; affective; associationistic; mediated by ‘vibes’ from past events; represented by concrete images, metaphors, and narratives; more rapid than System 2; immediate in action; slower more resistant to change, and changes with repetitive/intense experience. The rational system (categorized within System 2) is by contrast: analytic; intentional, effortful; logical; mediated by conscious appraisal of events; represented in abstract symbols, words, and numbers; slower than System 1; delayed action; changes more rapidly; changes with strength of argument and new evidence. Epstein claimed that the most, if not all, of the attributes of intuition “can be accounted for by the operation of the experiential system” (Epstein 2008, p. 33). Moreover, some dual-process theorists have speculated that System 2 processing evolved relatively recently (estimated at 50,000–60,000 years ago) in *Homo sapiens* but that System 1 processing is phylogenetically much older than this (Evans 2003).

More recently, evidence from social cognitive neuroscience, and specifically laboratory studies employing functional Magnetic Resonance Imaging (fMRI) have shed further light on this long-recognized dual distinction. Lieberman and his colleagues (Lieberman et al. 2004) found that intentional explicit judgements (i.e. in domains where participants had low levels of experience) were associated with activation of a ‘reflective’ system (referred to as the C-system), whilst intuition-based judgements (i.e. low-effort implicit judgements in areas where the participants had high experience) were associated with activations in a reflexive system (the X-system) (Lieberman et al. 2004) and including the amygdala and ventro-medial prefrontal cortex (cf. Somatic Marker Hypothesis above), see Table 30.2. These and other related developments have led some to speculate about the emergence of a ‘neuroscience of intuition’ (Segalowitz 2007). The insights provided by Damasio and his colleagues provide strong evidence that intuition has a neuro-physiological basis and, hence, is a biological phenomenon which is likely to manifest across all domains of professional practice.

30.2.6 *Towards a Definition of Intuition*

From Barnard’s initial efforts in the 1930s, intuition has been defined in various ways, see Table 30.2. As may be seen from this table, and as Hodgkinson et al. (2009a) have argued, intuition research was for many years dogged by problems of weak conceptualizations emanating from fields as disparate as Jungian psychoanalysis, ‘New Age’ thinking and cognitive psychology.

Table 30.2 Definitions of intuition arranged chronologically

Source	Definition
Barnard (1938, p. 306)	It consists of a vague feeling, or intuition, that certain things are relevant and others are not. This feeling ‘in our marrow’ is probably an outcome of previous experience that has not yet emerged into articulate thought. Its very vagueness shields it from critical scrutiny
Jung (1928)	A psychological function that unconsciously yet meaningfully transmits perceptions, explores the unknown, and senses possibilities which may not be readily apparent
Polanyi (1964, p. 24)	Intuitions are implicitly or tacitly informed by considerations that are not consciously noticed or appreciated
Westcott (1968)	Intuition involves awareness of things perceived below the threshold of conscious perception
Vaughan (1979, p. 27)	Knowing without being able to explain how we know
Rowan (1989, p. 96)	Intuition is knowledge gained without rational thought. It comes from some stratum of awareness just below the conscious level and is slippery and elusive. Intuition comes with a feeling of ‘almost, but not quite knowing’
Simon (1987, p. 29)	Analyses frozen into habit and the capacity for rapid response through recognition
Shirley and Langan-Fox (1996, p. 564)	A feeling of knowing with certitude on the basis of inadequate information and without conscious awareness of rational thinking
Sadler-Smith and Shefy (2004, p. 77)	Intuition is a capacity for attaining direct knowledge or understanding without the apparent intrusion of rational thought or logical inference
Dane and Pratt (2007, p. 9)	Affectively charged judgments that arise through rapid, non-conscious and holistic associations

Whilst such disparities may be “healthy and can never be totally resolved”, Hodgkinson et al. (2009a, p. 280) also argued that in management research there appears, at long last, to be a “growing consensus” that intuition is characterized by a capacity for attaining direct knowledge or understanding without the apparent intrusion of rational thought or logical inference. That is it is neither the opposite of rationality nor a random process of guessing nor a mystical ‘sixth sense’, and that an affective component is implicated in intuitive processing. Efforts in the early and mid-2000s which conceptualized intuition jointly in terms of cognition *and* affect and which were able to draw upon recent and relevant developments in cognitive and social psychology, such as that of Dane and Pratt (2007), provided a robust and workable definition and conceptualization of the construct. Indeed, it is their definition which has come to be preferred amongst many intuition researchers in business and management, namely: “intuitions are affectively charged judgments that arise through rapid, non-conscious and holistic associations” (Dane and Pratt 2007, p. 40). Grounded as it is in the fundamental cognitive and affective mechanisms which are the bases of intuition, Dane and Pratt’s definition is not domain-specific, therefore it may be applied usefully across other domains of professional practice.

30.3 Intuitive Expertise in Professional Practice

Building on what was already known about relevant concepts such as tacit knowledge and expertise, Sadler-Smith and Shefy (2004) argued that intuitions develop as a result of explicit and implicit learning processes. However, the extent to which intuitions are reliable and valid as a basis for taking decisions and solving problems depends crucially on the learning environment and whether feedback is used positively to nurture intuitive skills and develop ‘good’ intuitions. These authors describe feedback, and the learning which it enables, as being a ‘double-edged sword’: drawing on the work of Hogarth (2001) they noted that the environment in which professional practice is located can either enhance or suppress ‘good’ intuitions, and by the same token lead to the development of ‘bad’ intuitions. Hogarth (2001) described environments that enhance intuition through good feedback as ‘kind’ structures for learning, and those that suppress intuition or lead to the development of poor intuitions through little or low quality feedback as ‘wicked’ structures for learning. Similar distinctions were drawn by Kahneman and Klein (2009) between high validity and low validity environments with the corollary that for skilled intuition to develop the validity of the environment must be sufficiently high (i.e. where there are “stable relationships between objectively identifiable cues and subsequent events or between cues and the outcomes of possible actions”, p. 524) and there must be adequate opportunity to practice the acquired skill (p. 520).

The notion of intuition-as-expertise helps to explain how, when an experienced individual who has benefitted from good feedback in kind learning environments encounters a problem where the information can be matched non-consciously to a familiar pattern, an effective decision can be executed automatically and seemingly effortlessly. For example, Klein’s studies of fast-paced decision-making by fire-fighters and other professionals, contrary to expectations, found little that corresponded to the accepted rational model. Instead, there appeared to be a rapid and unconscious situation assessment and recognition from an array of stored templates followed by the taking of appropriate action when a ‘fit’ was found. Klein found this process, encapsulated in the Recognition Primed Decision (RPD) model (Klein 2003), to be an effective strategy “because it took advantage of the [fire ground] commanders’ *tacit* knowledge” which may be difficult for the expert to articulate (Kahneman and Klein 2009, p. 516, emphases added). Table 30.3 summarizes the attributes of situations favouring intuitive processing and analytical processing as identified by Klein (2003).

Sadler-Smith and Shefy (2004) and others (e.g. Sadler-Smith and Sparrow 2007) have also made the important distinction between ‘intuition-as-expertise’ and the models of heuristic thinking found in classical Behavioural Decision Theory (see Gilovich et al. 2002). The latter are focused narrowly on biased estimations and often erroneous ‘rules of thumb’, whereas the former is based upon a “broad constellation of past experiences, knowledge, skills, perceptions and feelings held tacitly and often arrived at by an implicit perception of the total problem before conscious awareness takes hold” (Sadler-Smith and Shefy 2004, p. 83).

Table 30.3 Attributes of situations favouring intuitive processing and analytical processing

Favouring analysis	Favouring intuition
Conflict resolution	Time pressure
Optimization	Ill-defined goals
Justification	Dynamic conditions
Computational complexity	Experienced participants

Adapted from: Klein (2003, p. 57)

However, in the complex and dynamic world of professional practice, even where high validity environments do exist, it is self-evident that not every situation will possess cues which fit a previously encountered scenario. Therefore, the acquisition of what has come to be known as ‘intuitive expertise’ (Kahneman and Klein 2009) is a long-term and on-going process (the oft-quoted norm is 10-years of learning and experience). In this respect, intuiting may be thought of as a ‘sense-making process’ whereby “concepts and their relationships may be re-defined, adjustments are made to the relevant mental structures to take situational differences into account. The structures themselves become adapted and more elaborated through the process of learning.” (Sadler-Smith and Shefy 2004, p. 83).

In the introductory remarks to this chapter it was pointed out that researchers have, for many years, acknowledged role and significance of tacit knowledge in informal, incidental and implicit learning in practice. Moreover, from what has been said above it is clear that intuitive expertise also draws upon knowledge which is tacit, i.e. difficult to articulate (Blackman and Sadler-Smith 2009). As Hogarth has noted, intuition and learning are inseparable and the cognitive mechanisms which support the development of intuitions “have their origins in multiple information-processing systems that operate below the level of consciousness and are heavily dependent on *tacit learning*” (Hogarth 2010, p. 339, emphases added). In delineating intuition from related constructs, it is worthwhile offering some comments on the differences between intuition and tacit knowledge in support of the assertion that *intuition embraces tacit knowledge* (see the discussion of Recognition Primed Decision model above) but unlike the classical view of tacit knowledge (see below) also includes an affective component which implicates not only a dual system of reasoning but also the cognitive and affective dimensions of decision making (see above) and the associated neurobiological systems.

Perhaps the most famous aphorism associated with the concept of tacit knowledge is that of Michael Polanyi who in his 1966 book *The Tacit Dimension* declared that “we can know more than we can tell” (p. 4). In this respect, ‘tacitness’ has two related dimensions concerned with the level of consciousness of the requisite knowledge for performing a particular skill and the degree of communicability of that knowledge. Skilled performers are often unable to explain their skilled performance to an unskilled person, and even when a performer has achieved self-awareness of the knowledge required to perform, it is difficult nonetheless to communicate this symbolically (i.e. in words) and it is often more easily

demonstrated (“since I cannot explain this very well, let me show you instead”) (Gertler 2003, p. 78). Tacit knowledge “has a personal quality that makes it difficult to formalize and communicate; it is intertwined (or ‘indwelled’) within mind and body” (Blackman and Sadler-Smith 2009, p. 571) and as a concept it is often invoked to explain the acquisition and execution of skilled performance acquired through implicit and explicit learning processes. Dane and Pratt (2007) maintained that both explicit and implicit learning will positively influence the effectiveness of intuitive decision making through the formation of “complex domain relevant schemas” (p. 43). The latter, when brought to bear automatically upon a problem are more likely to enable effective intuitive decision making, but such schemas are by definition not only domain relevant but also domain specific, i.e. they may not be generalized.

One implication of these discussions for professional practice is that complex domain relevant schemas may serve particular intuitive judgments well in the professional domain, but may lead to inaccurate judgments in other domains in which the decision maker lacks requisite expertise (e.g. when transferring between different job types, changing careers, or in personal life). A further implication relates to the quality of the activities and interactions in the environment which enable individuals to acquire and execute intuitive expertise. An upper limit is set upon the effectiveness of intuitive expertise by the weak regularities between cues and outcomes which characterize low validity environments (Kahneman and Klein 2009). As noted earlier ‘kind’ learning environments (where feedback is copious and accurate) create the conditions for valid inferences to be made based on intuitions (Hogarth 2001, 2010). On the other hand, in ‘wicked’ learning environments feedback may be lacking or misleading, the experiences upon which learning is based are either not representative or lack validity, and learning leads to invalid inferences, judgments and predictions (Hogarth 2001, 2010).

In order to build intuitive ‘muscle power’ (Klein 2003) and develop a capability to be able to trust intuition it is important that practitioners: firstly, recognize and acknowledge the power that intuition may or may not have as a decision making and problem solving tool in a given environment (in low validity environments it may lead to useless predictions and be no better than guessing); secondly, create the conditions whereby they may receive relevant, copious and accurate feedback on their intuitive judgments (Hogarth 2001, 2010; Kahneman and Klein 2009). It is equally important that institutions and organizations configure learning environments in ways that are ‘invitational’ to the acquisition of intuitive expertise through the provision of opportunities for practice by means of guidance and coaching, and ensuring the availability of feedback on performance. The salience of expertise in relation to professional and practice-based learning may be summarized thus: intuitive expertise is grounded in “knowledge that is developed by explicit and implicit processes of professional learning” rather than “innate capabilities”, hence the powerful notion of ‘expertise’ provides “an educational [and therefore developmental] account of intuition” (Harteis and Gruber 2007, p. 75).

30.4 Intuition and Insight in Creative Problem Solving

Insight is significant in the field of professional practice because it has been long-recognized as having an important role to play in creative problem solving (Sternberg and Davidson 1995). In many areas of professional practice, and especially in the management arena, creativity, invention and innovation are vital individual and organizational sources of competitive advantage in the fast-paced, globalized business environment of the twenty-first century (Pink 2005). Moreover, beyond these competitive instrumentalities, acknowledging and accommodating creative intuition can enable personal and professional growth and change (Atkinson and Claxton 2000). Intuition *and* insight both are implicated in the processes leading to creativity, invention and innovation, hence from the perspective of professional and practice-based learning an understanding of the role that they play in one's own creative capacities is an important aspect of meta-cognitive knowledge and skill (i.e. the declarative and procedural knowledge about and for the regulation of one's cognitive activities during learning, see: Flavell 1979).

'Intuition' and 'insight' (as well as 'instinct') are often used interchangeably, however they are by no means synonymous. Instinct is an automatic reaction to a stimulus which has an innate, biological, and reflexive origin; insight on the other hand involves suddenly 'seeing' the solution to a perplexing problem (e.g. having a 'eureka moment'); intuition, which is neither of these things, is an "involuntary, difficult-to-articulate, affect-laden recognition or judgment, based upon prior learning and experiences, which is arrived at rapidly, through holistic associations and without deliberative or conscious rational thought" (Sadler-Smith 2008, p. 31).

Educator and political scientist Graham Wallas' (1926) offered his "seminal" stage model of creative problem solving which not only distinguishes between but also links intuition and insight (Hélie and Sun 2010, p. 995). The model was described by Seifert et al. (1995) as follows: *mental preparation*, confronting and conceptualizing core aspects of problem; non-conscious *incubation*, either because of a problem solving impasse, or deliberately putting the problem aside and thinking about other matters; *intimation* of an impending solution, this stage is often overlooked in interpretations and accounts of the process (e.g. Hélie and Sun 2010), such intimations are sometimes referred to as 'feelings of knowing' (Koriat 1994); *illumination* at the moment of insight, a penetrating and unexpected flash of insight presents a satisfactory problem solution; *verification*, working-out the details of the solution, and whether or not it can be developed practically, see Table 30.4.

Insight is not a naïve process, it is the product of the 'prepared mind' (Seifert et al. 1995, *cf.* 'expert mind-set') drawing upon patterns in long-term memory based on a substrate of prior knowledge (Kahneman and Klein 2009). At the moment of insight an individual is able to perceive relationships between the elements of a problem and articulate novel or previously unobserved (i.e. creative) connections, prior to this illuminative moment the possibility of such connections may be 'sensed' (i.e. are intuited) but not readily explained (i.e. they are pre-verbal). For example, in the field of business venturing 'alert' entrepreneurs are able to sense or notice "discrepancies" in

Table 30.4 Wallas' model of the creative problem solving process

Stage	Description
<i>Problem requiring solution</i>	Exposure to complex problem in domain in which problem solver possesses relevant expertise
<i>Problem solving impasse</i>	Problem fails to yield to rational analysis
<i>Incubation</i>	Non-conscious mental processes, e.g. spreading activation
<i>Intimation</i>	'Feelings of knowing'; pre-verbal perceptions of coherence; intuition
<i>Insight</i>	'Eureka' or 'aha' moment; illumination; sudden realization of problem solution of problem solving strategy; no longer pre-verbal
<i>Verification</i>	Development of creative idea; feasibility testing and screening; prototyping; market testing; manufacturing; marketing

Adapted from: Sadler-Smith (2008, p. 73)

the form of profit opportunities and hence solve a problem creatively by “render[ing] existing [market and economic] relationships inconsistent” (Kirzner 2009 p. 148). This creative problem-solving may involve ‘connecting the dots’ between new technologies, emerging markets, demographic changes or government policies (Baron and Ward 2004, p. 559). The intimation (i.e. intuition) referred to by Wallas corresponds to the “inexplicable sense” of what ‘might be possible’ (Crossan et al. 1999, p. 527) and “that which has hitherto not been suspected of existing at all” (Kirzner 2009, p. 151). When intuitive preverbal intimations of what may be just ‘around the corner’ lead to insight there is “filling in the gaps in the available information” which brings about logical closure in the form of the discovery of a new invention, innovation or business opportunity (Dimov 2007, p. 566).

Such ‘creative intuitions’ are to be found in accounts of technical and scientific discovery, artistic endeavour, as well in business venturing. For example, the Nobel laureate in Medicine Michael S. Brown declared that “as we did our work, I think, we almost felt at times that there was almost a hand guiding us...we would go from one step to the next, and somehow we would know which was the right way to go” (Sadler-Smith 2008, p. 66). Similarly, pharmaceutical researchers at AstraZeneca perceived the roles of intuition and creativity as intertwined in their ground-breaking innovations and saw intuition as a “type of thinking that is captured by metaphors such as ‘thinking outside the box’ or ‘seeing the broad picture’, that is, metaphors that depict intuition as the ability to see relationships, causalities, and other associations for which there are not yet proofs of such relationships” (Sundgren and Styhre 2004, p. 276). In the creative arts it is argued that Picasso “had a general idea or intuition about what he would like to express through his medium. The medium itself was used to give further meaning to the intuition” (Feldman 1985 cited in Policastro 1995, p. 102). Similarly, in musical composition the twentieth century Russian composer Stravinsky claimed that he was the ‘vessel’ through which his most famous composition the ‘Rite of Spring’ passed, he simply “heard” it in his head and wrote down what he ‘heard’ (Sadler-Smith 2008, p. 16).

At cognitive and neural levels, accounts of the phenomenon of insight and creative intuition have been offered which explain it in terms of neural activations spreading through networks of associations in long-term memory; these activations are not, in

the incubation phase, available to conscious awareness (Dorfman et al. 1996). During incubation neural activation is preconscious and preverbal up to the point at which illumination occurs, at which time it crosses a threshold into conscious awareness. Jung-Beeman and colleagues in a series of fMRI and electro-encephalograph (EEG) studies found striking increases in neural activation in the right hemisphere (RH) anterior superior temporal gyrus (aSTG) when participants solved insight problems compared to the activations observed for non-insight problems (Jung-Beeman et al. 2004). They argued that the RH aSTG facilitates the integration of information across distant relations thereby enabling problem solvers “to see connections that had previously eluded them” (p. 0507). The spreading activation mechanism which may be responsible for this process resonates with numerous narrative accounts of insightful scientific discoveries from antiquity (e.g. Archimedes) to modern times (e.g. Poincaré) (see Jung-Beeman et al. 2004; Sternberg and Davidson 1995).

Pasteur’s aphorism that ‘chance favours the prepared mind’ has a number of implications for understanding the role of creative intuitions in professional practice. Firstly, creative problem solving requires the existence of an extensive knowledge base upon which divergent thinking may operate and within which diverse connections be made, however a downside of expertise is that it may lead to ‘tunnel vision’ and ‘grooved thinking’ (Sparrow 1999). Secondly, it is possible to create the conditions for insights to arise by allowing space for a mental ‘time-out’ and thereby enable activations that exist beneath the level of conscious awareness to spread and incubate and emerge eventually into conscious awareness (Jung-Beeman et al. 2004; Sadler-Smith and Shefy 2004, 2007). Thirdly, the ‘preparedness’ of the mind may be innate to the extent that there are individual differences in the ability to generate the divergent associations which characterize creative outcomes (Mednick 1962; Simonton 1980). Also, whilst it may be possible for many people to recognize such associations when they see them, relatively “few can find them without prompting” (Kahneman and Klein 2009, p. 521).

The implications for learning and meta-cognition in professional and practice-based contexts are potentially significant. Firstly, expertise lies at the heart of most forms of intuition, including creative intuitions (see Dane and Pratt 2009). Secondly, it is possible to manipulate and manage the attributes of the environment to enhance the possibilities for creative intuitions to arise (see Sadler-Smith and Shefy 2007). Thirdly, expertise and environmental affordances may be necessary but insufficient conditions for creative intuitions – individual differences in the ability to generate divergent thought patterns may also have an important role to play (see Feist 1999).

30.5 Individual Differences in Preferences for Intuitive Processing

Cognitive styles are preferences (most often measured by means of self-report) for particular modes of representing (e.g. verbal/visual) and processing information (e.g. analytical/intuitive). When averaged-out over a variety of tasks and the longer

term, the majority of individuals have a proclivity to process information using a particular mode of representation (e.g. visual rather than verbal) and of processing (e.g. intuition rather than analysis). These stylistic predispositions develop as a result of a variety of factors, including age, gender, personality, ability, education and experience (Zhang and Sternberg 2005). Numerous dimensions and models of cognitive style have been postulated by researchers over the past half-century or so, e.g. field dependent/field independent, holist/serial, visual/verbal, intuitive/analytic, experiential/rational, etc. (Kozhevnikov 2007). Individual differences in preferences for analysis and intuition are an important factor in professional and practice based learning for a number of reasons:

1. The intuitive/analytic model is relatively unique in cognitive styles' research in that it is commensurate with dual-process theories which, as was noted above, are not only important in a number of sub-fields of psychology (Epstein 1994; Lieberman 2007; Sloman 1996; Smith and DeCoster 2000; Stanovich and West 2000), they also present a coherent and compelling account of the ways in which professionals think, judge and decide;
2. The intuition/analysis dimension of cognitive style has been shown to be relevant for a variety of education and work-related outcomes (Armstrong et al. 2012; Coffield et al. 2004);
3. Individual differences in preferences for intuitive and analytical processing may be diagnosed in occupational settings using compact, valid and reliable inventories (Hodgkinson and Sadler-Smith 2011), for example Epstein et al's. (1996) Rational Experiential Inventory (REI).

Cognitive styles researchers have debated whether or not the dimensionality of the analysis/intuition construct is unitary (i.e. intuition and analysis are opposite ends of a single style dimension) or dual (i.e. intuition and analysis are separate orthogonal dimensions of styles). This debate is important theoretically (because the dual conceptualization of style fits with dual processing theory) and practically (because the dual conceptualization of style allows for the possibility of individuals being high on one or other dimension, low on both dimensions, or high on both dimensions; this is precluded by the unitary conceptualization). The accumulated evidence is compellingly supportive of the dual conceptualization (e.g. Coffield et al. 2004; Hodgkinson and Sadler-Smith 2003; Hodgkinson et al. 2009b) and these various psychometric, construct validation, and critical appraisals are also supported by evidence from intuition research. For example, Agor (1989), in his research with senior business executives, identified three different approaches to decision making: giving intuition a free rein in order to foresee the correct path to follow and to avoid a rigorous step-by-step method (Agor described this group of individuals as 'explorers'); using a structured decision making system that involved gathering and analysing all the relevant data ('synthesizers'); cross-checking initial intuitive feelings against the data ('eclectics'). Similarly, Betsch (2004) found that people were able to adapt to the requirements of the situation by choosing the appropriate strategy (e.g., opting for intuition when intuitive judgements were appropriate), but dispositions and preferences led a majority of

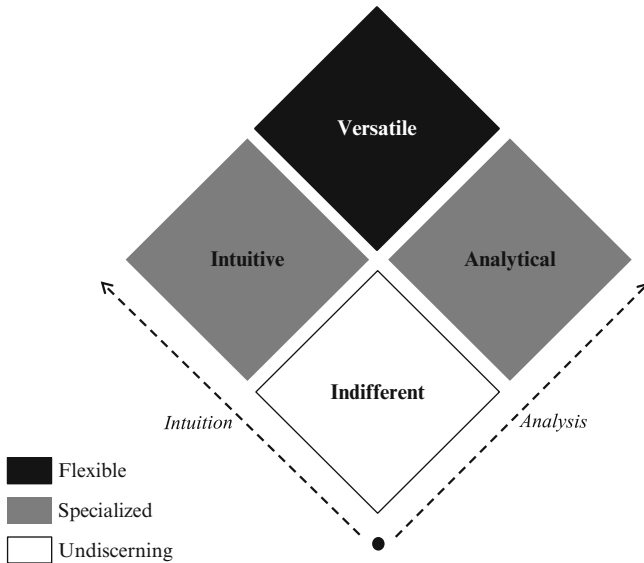


Fig. 30.1 A typology of intuitive and analytical cognitive styles (Adapted from: Hodgkinson and Clarke 2007; Sadler-Smith 2002, 2008, 2011)

individuals to choose either intuition or analysis (which she called ‘deliberation’) more frequently across all scenarios, i.e. individuals in the main tended to opt for their preference (intuition or analysis) in spite of the demands of the task (Betsch 2004, 2008). About two thirds of Betsch’s sample were either high on intuition and low on deliberation (i.e. analysis) or vice versa, while the remaining third were high or low on both scales, indicating that the latter group use intuition or deliberation without clear preferences (Betsch 2008).

On the basis of the dual model of cognitive style a number of researchers have proposed that intuitive and analytical information processing modes may be combined to form a 2×2 typology of cognitive styles (Hodgkinson and Clarke 2007; Sadler-Smith 2002, 2011; Whetten et al. 2000); this shown in modified form (i.e. rotated anticlockwise through 45° from horizontal) above.

The typology as represented in Fig. 30.1 has a hierarchical structure:

1. At the ‘undiscerning’ level, individuals do not have a ‘style’ as such. Instead, they deploy “minimal cognitive resources” being neither intuitively or analytically discerning, with the consequence that they may rely on the opinion and received wisdom of others, and employing a ‘cognitive least effort principle’ (Hodgkinson and Clarke 2007, p. 247).
2. At the ‘specialized’ level, the intuitive and analytic styles represent relatively stable preferences for intuitive processing or analytic processing each of which is contextually appropriate and has its own strengths and weaknesses (Sinclair and Ashkanasy 2005). As a consequence, analytics may approach problems meticulously attending to details in a logical and systematic manner but in doing

so may become cognitively “overburdened” to the extent that they lose sight of the ‘bigger picture’ (Hodgkinson and Clarke 2007, p. 246) and may be ‘unable to see the wood for the trees’ or are frozen by ‘analysis paralysis’;

3. At the ‘flexible’ level, intuitive *and* analytic processing is used interchangeably, and ‘versatile’ individuals have the capability for “switching cognitive gears” from conscious analytical engagement to automatic intuitive processing as the situation demands (Louis and Sutton 1991, p. 55).

One inference which may be drawn from this analysis is that the versatile style differs not just qualitatively, but also quantitatively from the other styles. That is, more of the versatile style is better than either of the two specialized styles alone, and the specialised styles whilst they are qualitatively different from each other are better than the indifferent style. Taking this argument a step further, individuals with a versatile style are able to engage in specialized intuitive *and* analytical processing rather than being habituated to intuitive *or* analytical processing. Hence, cognitive versatility in so far as professional and practice-based learning are concerned is a legitimate developmental goal.

In business and management education, rational and analytical tools and techniques have been privileged over the development of an ‘intuitive awareness’ (Sadler-Smith and Shefy 2004, 2007). A corollary of this privileging is that management practitioners who have developed a marked preference for intuition *or* analysis may benefit from interventions in the form of training or coaching in order to acquire the necessary cognitive strategies to enable them to become cognitively versatile, e.g. ‘analytics’ may need to become more ‘intuitively aware’ and *vice versa* (Sadler-Smith 2011). Hence, over-and-above the habitual deployment of one’s preferred style (which may or may not be commensurate with the task), developing a repertoire of approaches comprising intuitive and analytical cognitive styles in order to learn, problem-solve, and take decisions with cognitive versatility in increasingly dynamic, complex and time-pressured professional contexts is a vital capability and requires individuals to ‘think about their thinking’ and concomitantly ‘learn how to learn’. These essentially metacognitive processes (Sadler-Smith 2011) are indispensable elements of any professionals’ ‘intellectual toolkit’.

30.6 Implications for Professional and Practice-Based Learning

In spite of the fact that the significance of deliberative learning is commonly over-emphasized in professional education (Eraut 2000), effective professional and practice-based learning should not privilege formal, planned and explicit experiences at the expense of other kinds of experiences such as those afforded by the circumstances of practice and practice settings. Moreover, as has been argued in this chapter, intuition is perhaps the least well understood and under-researched aspect of the practice-based contributions to professional and practice-based learning.

Intuition is nonetheless a crucial component of professional knowledge and one which warrants further attention (Harteis and Gruber 2008). Thus, a number of practical issues arise with respect to the learning and development of intuition, and it is on these pragmatic concerns for professional and practice-based learning that attention is now focused.

Several books and journal and magazine articles have appeared in recent years which offer insights and tools and techniques for understanding, educating and developing intuition (e.g. Gladwell 2005; Hogarth 2001; Klein 2003; Myers 2004; Sadler-Smith 2008, 2010). In this Section I will focus on the half-dozen suggestions offered by Sadler-Smith and Burke (2009) for fostering intuition in management learning and education, and which are likely to be applicable to professional and practice-based learning in other domains also.

1. *Dispel myths about intuition*: in certain sections of the popular imagination intuition is often equated with a ‘sixth sense’ and people may be exhorted to follow it ‘no matter what’ – this view is often to the fore in certain ‘self-help’ literatures (e.g. Klingler 2004). Equally, in other ‘hyper-rational’ quarters intuition has been depicted as highly untrustworthy (e.g. Bonabeau 2003). Neither of these represents an accurate or useful starting point for developing good intuitions. The starting points for a scientific understanding of intuition are to dispel such myths by firstly drawing on the accumulating body of knowledge in psychology and neuroscience about the nature, causes and effects of intuition (e.g. Hodgkinson et al. 2008). Secondly, these could be advanced through examining critically many of the famous case studies documented by Gladwell (2005), Kahneman (2011), Klein (2003) and others which not only offer vivid and informative illustrations of the powers and the pitfalls of intuitive judgment but also present and ‘package’ the science of intuition in an authoritative and accessible style;
2. *Journaling intuitions*: the use of journaling as a means of developing an enhanced intuitive awareness was implemented and evaluated in the professional learning of experienced managers by Sadler-Smith and Shefy (2007). The value of journaling intuitions, which was pioneered in a systematic way by Taggart (1997), is that it allows learners to reflect upon their own intuition-in-use, identify how it manifests in their subjective experience, and analyse conditions under which it worked well (‘intuitive hits’) and when it worked less well (‘intuitive misses’). A principal benefit of the regular and systematic journaling of intuitions over a period of time is that it may enable patterns to be discerned via ‘reflection-on-action’ (cf. Schön 1983) which are not immediately apparent from a small number of unexamined instances. Furthermore, social media and mobile technologies offer new opportunities for capturing and sharing intuitions *in vivo* (Hodgkinson and Sadler-Smith 2011);
3. *Scrutinizing intuitions and giving good feedback*: following-up on the notion of intuitive hits and misses and Hogarth’s notion of kind and wicked learning structures (Hogarth 2001, 2010), reflecting-on and obtaining feedback on the consequences of decisions, which are intuitive or rational or a combination of both, is essential in honing decision making expertise. Feedback, as was noted above can

be a double-edged sword and the type and quality of feedback can be crucial in determining if the workplace environment enhances or suppresses good intuitions. Sadler-Smith and Burke (2009, pp. 251–252) offer the example of a wicked structure for learning as one in which “a manager’s intuitions were simply agreed with irrespective of their merit (perhaps by virtue of the influence or power he or she wields), where the prevailing climate was one of acquiescence, the unquestioning acceptance of intuition or the over-riding of moral intuitions and ethical values; any of these may lead to misplaced levels of confidence and reinforcement of bad judgments.” One of the least helpful things that peers and subordinates can do as far as leaders’ developing reliable intuitive judgment is concerned is to be ‘yes people’ who fail to engage in open dialogue or offer challenging but constructive feedback on intuitive ‘judgment calls’;

4. *Being aware of biases*: a vast literature exists in the field of Behavioural Decision Theory (BDT) in relation to the systematic and recurrent errors and biases associated with intuitive judgments. This work has recently been summarized and presented for a wider audience by the seminal figure of BDT, the 2002 Nobel Laureate Daniel Kahneman, in *Thinking Fast, and Slow* (2011). It is important that professionals are aware of the automatic and pervasive biases that affect judgments and decision making under conditions of uncertainty (Gilovich et al. 2002). For example, confirmation bias may be particularly problematic in practice-based learning. It occurs when individuals evaluate evidence in such a way to confirm their hypotheses; individuals treat conflicting evidence as if it were supportive of their previously held beliefs. Sadler-Smith and Burke (2009) suggest that a ‘point-counterpoint’ or other structured debate technique may help learners avoid the confirmation bias when they are tempted to “over-fit the data” to their preferred solution. Where possible other types of biases need to be acknowledged and ameliorated through similarly appropriate means;
5. *‘Give the rational mind a reprieve’*: developments in cognitive and the brain sciences confirm Wallas’ insight from almost a century ago that the mind is continuously processing information when we are awake, sleeping and dreaming even if we may not be consciously aware of the fact, and this may account for the “eureka” moments associated with incubation and insight (see above). Sadler-Smith and Burke (2009) suggested that mental relaxation can be an important means by which “the incessant din of reasons” and the associated “deprecation [i.e. self-censoring] of non-logical mental processes” (Barnard 1938, p. 305) can be ‘quieted’. They note: however, that such activities may be perceived as “paradoxical to the extent that tuning into these thought processes can only be through a passive volition because they tend to occur spontaneously, involuntarily, and beyond conscious control” (Sadler-Smith and Burke 2009, p. 254). Various tried-and-tested techniques for ‘quieting the rational mind’ have been documented (e.g. Suzuki 2010; Taggart 1997; Vaughan 1979). It is interesting to note that some recent developments in the brain sciences such as Unconscious Thought Theory (Dijksterhuis 2004) offer a new, if perhaps controversial, insight into the power of ‘thinking without thinking’;

6. *Understanding exposure vs. experience*: as first suggested by Chester Barnard and Herbert Simon the capability to intuit solutions to problems in an informed way is rooted in deep knowledge structures within a particular field of practice – Dane and Pratt (2007) referred to these as ‘complex domain relevant schemas’. The development of intuitive expertise is time-dependent (a 10-year ‘rule of thumb’ is often quoted) and there are few if any shortcuts. Sadler-Smith and Burke (2009) argue that superficial or *ad hoc* exposure in any experiential learning situation, or simply learning through making mistakes, is likely to be at least and inefficient, and probably ineffective, in building ‘intuitive muscle power’ (Klein 2003). As they noted: “exposure is not sufficient” (p. 254), intuitive expertise is developed through more structured and meaningful experiences; for example, exposing learners to new and unfamiliar situations outside of their ‘comfort zone’ but within safe environments (e.g. the classroom) and guiding them through the solving of complex, uncertain and time-pressured problems through role modelling, coaching and feedback. This kind of exposure can also be gained on-the-job through internships, mentoring, job shadowing, etc.

30.7 Empirical Approaches

Self-report, in spite of its inherent limitations, has been a mainstay of intuition research in laboratory and field settings and has contributed much to the understanding of the nature and role of intuitive judgment in management and organization studies (Hodgkinson and Sadler-Smith 2011). Self-report is most often used to assess individual differences in preferences for analysis and intuition, and various instruments are available, for example, Cognitive Style Index (CSI, Allinson and Hayes 1996); Preference for Intuition and Deliberation Scale (PID, Betsch 2008); Rational Experiential Inventory (REI, Epstein et al. 1996); Linear Nonlinear Thinking Styles Profile (LNTSP, Vance et al. 2007). From the perspective of ‘intuition-as-expertise’, various assessment methods are available such as applied cognitive task analysis (to identify the cues and strategies that experts use to support their intuitive judgements) and tacit knowledge tests in which scenario-based assessments are used to compare participants’ responses to complex judgemental problems against those of experts. Intuitive episodes may be recovered retrospectively using Critical Incident Technique (for example to compare intuitive ‘hits’ and ‘misses’), and other approaches such as ‘thinking aloud’ offer means for capturing intuiting and intuitions in the moment of occurrence. Finally, the physiological and neural correlates of intuitive processing may be tapped into using electro-physiological measures such as (electro-encephalography) and imaging techniques such as functional Magnetic Resonance Imaging (fMRI). For a review and critique of these various approaches see Hodgkinson and Sadler-Smith (2011).

30.8 Conclusion

Although intuition may have ‘come of age’ in the behavioural sciences, intuition was until relatively recently seen as being somewhat eccentric and slightly esoteric, akin to ‘New Age’ thinking (Hodgkinson et al. 2008). Moreover, only the “bravest and most farsighted of individuals” acknowledged its utility in the practice of business management (Hodgkinson et al. 2009a, p. 277). Much has changed over the past decade and numerous books and articles, both popular and scientific, have appeared on the subject to the extent that practitioners now need to be cautious in separating the wheat from the chaff. Furthermore, as Akinci and Sadler-Smith (2011) noted there has been a relative abundance of theorising but a comparative paucity of field work, so much so that it is perhaps time that more intuition researchers ‘grasped the empirical nettle’ through quantitative, qualitative, laboratory, field and longitudinal studies. This is as true of the field of professional and practice-based learning as it is of other applied fields in which intuition is important, and Harteis and Gruber and others have offered a number of signposts for empirical work in this area. Intuition researchers generally are fortunate in that there are compelling theoretical bases upon which their investigations may be based, some of the long-standing issues and controversies in so far as self-report assessment of intuitive and analytical styles are clarifying and, most encouragingly, the topic is one which is embraced invariably with enthusiasm by practitioners who instinctively and intuitively recognise its intrinsic interest and potential relevance and worth. Nonetheless, significant methodological challenges remain (Hodgkinson and Sadler-Smith 2011) and intuition researchers should always be open to critically appraising the current state-of-the-art conceptually and theoretically as well as staying abreast of developments in the source disciplines. This is especially so in the light of emerging insights from the cognitive and brain sciences whilst being alert to the potential for conceptual seduction of the uninitiated by seemingly impressive ‘neural geographies’ mapped using the latest generation of imaging techniques. Nonetheless, these are exciting times for professional and practice-based learning researchers who may wish to understand and explain this vital aspect of human cognition and learning. I leave the final words to the person with whom this journey began, Chester I Barnard, for whom the practice of the professional manager meant: “developing the artistic principle in the use of the mind, attaining proportion between speed and caution, between broad outlines and fineness of detail, between solidity and flexibility. As in other arts, the perfection of subsidiary techniques and their effective combination both require constant *practice*.” (Barnard 1938/1968, p. 322, emphases added).

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Chapter 31

An Organisational Perspective on Professionals' Learning

Bente Elkjaer and Ulrik Brandi

(...) to study organizations involves thinking about philosophy, politics, ethics and much more. And behind or beyond these abstractions are the lived experience of people not just working together but joking, arguing, criticizing, fighting, deciding, lusting, despairing, creating, resisting, fearing, hoping or, in short, organizing.

(Grey 2005 [2013]: 2)

Abstract The purpose and contribution of our chapter is to provide a vision for professionals' learning in light of the field of organisational learning, and through this lens to incorporate various understandings of the organisational dynamics that professionals work and learn in and through. Inspired by some of the founding fathers of the field of organisational learning, Chris Argyris and Donald Schön (1978, 1996: 3), we ask: "What is an organisation that professionals may learn?" We answer this question by introducing three understandings of organisations and the learning theories that they are connected with. These are respectively a behavioural, a cognitive and a practice-based perspective on organisational learning. We propose that these lenses on organisations and learning may help us see professionals' learning as contextualised in both their work practices and their places of work, i.e. organisations.

Keywords Organization studies • Organizational learning • Professional development • Learning theories • Practice-based studies • Pragmatism

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31.1 Introduction

For decades professionals' learning and development has been a concern for researchers within a plethora of research disciplines such as sociology, psychology and education. In 1974, Argyris and Schön made a proposal about how to redesign professional education in order to align it better with professionals' actions at work (Argyris and Schön 1974 [1978]). According to Argyris and Schön (1974 [1978]), the problem was that the educational institutions of professionals were not sufficiently able to develop competent practitioners. One of the main arguments put forward by Argyris and Schön (1974 [1978]) was that the actual work practices and knowledge derived from practising professional work was missing from the curriculum of the educational institutions of students wanting to become able professionals.

Elaborating on Argyris and Schön's joint argument, Schön (1983, 1987) raised several issues regarding the training of professionals and proposed a model for professionals' learning involving the concept of the "reflective practitioner". In his work, Schön (1983, 1987) captures the need to organise professionals' learning and continued professional development (CPD) with a point of departure in professionals' actions at work and relevant knowledge established through the notions of "reflection-in-action" and "reflection-on-action" rather than from mere acquisition of abstract and technical knowledge taught in schools of professional education (see also Boud and Hager 2011; Gold et al. 2007).

The work of Argyris and Schön (1974 [1978]) and later Schön (1983, 1987) continues to be an inspiration for research into professionals' learning because it stresses the importance of bringing in knowledge of work and particularly of reflection in and on professionals' actions at work as a means to generate professionals' knowledge (see e.g. Billett 2010; Boud et al. 2006; Høystrup 2004; Moon 2000; Reynolds and Vince 2004). Scribner (1999) is one scholar who writes about professionals' learning within the teaching profession as tightly connected to the affordances in the specific contexts of work in combination with motivational factors and learning activities. In the same vein, Eraut (1994, 2007) argues for the importance of bringing in the work context in order to understand and design professionals' learning.

However, even though both Argyris and Schön and later contributions on professionals' learning and development stress the need to include the actual work done by professionals as important for professionals' learning, the literature still seems to be dominated by research and policy papers that assume that the learning done by professionals takes place primarily outside the workplace, involving knowledge of the growth of the knowledge economy (Jensen et al. 2012). In a recent paper, Zukas (2012) shows that accounts of professionals' learning often fail to consider the fact that processes of learning are closely entangled with work and organisational factors. This failure to include professionals' work contexts in understanding their learning is also noted by Fenwick and colleagues (2012b), who emphasise that despite the reflection of practice-based theories of learning inspired first and

foremost by the work by Lave and Wenger (1991), the problem of how to include context in professionals' learning remains unresolved. A review on professional learning within a specific profession, the teaching profession, supports this claim (Opfer and Pedder 2011). Summing up, Opfer and Pedder (2011) conclude that the analysis of professionals' learning is still dominated by approaches that isolate learning and development from the complex environment in which professionals work.

In other words, the discussion of professionals' learning and how to include their work contexts remains an unresolved topic within the field of professionals' learning (see also Mulcahy 2012; Smeby and Heggen 2012). In this chapter, we intend to remedy this by including the field of organisation studies and particularly the field of organisational learning to bring in not only professionals' work but also the dynamics of organisational practices and learning. The idea of bringing in concepts from organisation studies to advance our understanding of professionals' learning was propounded some time ago by Mintzberg (1983) during the days when the work of professionals was characterised by less ambiguity. Mintzberg's (1983) understanding of organisations is related to the coordinating mechanisms of work in organisations. He presented a concept of organisations in which the coordination of work was done by the standardisation of input skills, i.e. specifications of training and education as "professional bureaucracies", and it is in these organisational forms that professionals are to be found according to Mintzberg (1983).

In Mintzberg's (1983) understanding, professionals arrive in the workplace with adequate knowledge and skills and in principle no need for further education and learning. This is clearly no longer the case, as mirrored in the rather intense interest in professionals' learning and CPD (see for example Fenwick et al. 2012a; Jensen et al. 2012), which reflects, we believe, the equivocal developments of professionals' work (see also Broadbent et al. 1997; Weber 2004). The effects of New Public Management (NPM) on the way professionals' work is organised and managed, and the increasing use of external knowledge institutions producing so-called evidence-based knowledge with the purpose of controlling professionals' work as well as the resulting "de-professionalisation" of professionals' work and knowledge, have been debated for years; and the debate is not over yet (see for example Hjort 2009; Samuel 2012). The change in the way professionals work, involving increasing collaboration with other professionals in teams and focusing on specific problems, also seems to be a new development in the way the work of professionals is organised (Fenwick et al. 2012a). The result is that professionals now need not only an increasing degree of cross-disciplinarity and the ability to understand other fields of professional work, but also more specific professional expertise (Bechky 2003; Fournier 2000).

Evetts (2009) has captured this equivocal development of professionals' work by pointing towards new ways of using the term "professionalism". She provides a useful framework in her work incorporating both continuity and change in the work of professionals. She coins the notions of "organisational professionalism" and "occupational professionalism" in order to analyse different uses of the term professionalism in contemporary societies and enterprises. She argues that *organisational*

professionalism is manifested by a discourse of control, used increasingly in workplaces and by management. *Occupational* professionalism, on the other hand, is constructed within professional occupational groups themselves and incorporates collegial authority, which means that control is guided by codes of professional ethics monitored by professional institutions and associations. Evetts (2011) proposes that one way to advance our understanding of professionals' work in light of organisational professionalism may be to bring in knowledge from organisational studies. A similar message emphasising the value of infusing knowledge from organisation studies into research on professionals' work and knowledge is echoed by Muzio and his colleagues (Muzio et al. 2011). Based on their analysis of three occupations, they show a change in discourses on professionals' work from an "old collegial model" to a "new corporate model". This transition from occupational professionalism and collegiality towards organisational professionalism and corporality demonstrates the ambiguity related to professionals' work described above.

Our pointing towards the field of organisational learning in order to inspire a renewed understanding of professionals' learning is in line with the above call for bringing in organisation studies. The purpose and contribution of our paper is to interpret professionals' learning in light of the field of organisational learning, and through this lens to bring in different understandings of the organisational dynamics that professionals work and learn in and through. In a slightly paraphrased way, we ask: "*What is an organisation that professionals may learn*" (Argyris and Schön 1996: 3)? Concretely, we introduce different understandings of organisations and the learning theories that may be traced in the field of organisational learning (Brandi and Elkjaer 2011). We believe that these different concepts of organisations and learning may help us see professionals' learning as contextualised in work practice and knowledge as well as in places of work, i.e. organisations. Although traces of the different understandings of organisations and learning may still be found in research and practice, we propose that a point of departure in a practice-based understanding of learning from the perspective of pragmatism and continuously emerging and changing ways of organising rather than organisations as structures and systems is more in line with professionals in transition.

31.2 Three Organisational Learning Perspectives on Professionals' Learning

Since the late 1950s, when organisational learning emerged as a research field within organisation and management studies firmly rooted in psychology and economy, organisational learning has grown considerably as a field (for a recent summary of this, see Easterby-Smith and Lyles 2011). However, when researchers from different disciplines use the term "organisational learning", it covers and alludes to different understandings and methodologies reflecting differences in defining and assessing organisational learning (Argote and Miron-Spektor 2011; Rashman et al. 2009). It is not possible to construct a homogeneous and "authoritative" account of

the different understandings of “what is an organisation that it may learn” (Argyris and Schön 1996: 3) due to its many contributing disciplines (for a classic overview, see Easterby-Smith 1997). Our presentation of organisational learning below is an attempt to classify theories and research on organisational learning developed over time, reflecting the general development of organisation studies and of how to understand workplaces as organisations.

We use three labels for organisational learning reflecting a behavioural, a cognitive, and a practice-based perspective. These perspectives respectively come with different understandings of what learning is, what an organisation is, and how organisational learning unfolds. The behavioural perspective has a focus upon how procedures and routines are changed in organisations through problem-solving and learning (Cyert and March 1963 [1992]; March and Simon 1958). Weber's understanding of organisations as bureaucracies acts as a source of inspiration for the behavioural perspective on organisational learning (Heugens 2005). The cognitive perspective on organisational learning uses the concept of “theories of action” to point to the mental representations of actions as the most crucial term in order to understand organisational learning (Argyris and Schön 1978, 1996). In this perspective, learning is related to individuals' abilities to change their theories of actions and subsequently their actions when they act defensively, which prevents errors from being corrected and learning to flourish. An understanding of organisations as “learning systems” frames organisational learning in the work of Argyris and Schön (Argyris 1992; Lipshitz 2000). The practice-based perspective on organisational learning focuses upon practice as both doings and institutionalisations within an understanding of organisations as communities of practice (Brown and Duguid 1991; Gherardi and Nicolini 2002). In this understanding, learning is part of practice and is detected through patterns of access and participation in organisational practices.

In the following sections, we elaborate on how it is possible to understand professionals' learning within these three perspectives on organisational learning with a specific focus upon the organising dynamics, the understanding of organisations. We do so by first explaining each of the organisational learning perspectives and then providing some empirical examples of how an understanding of professionals' learning may be developed through the respective understandings of organisational dynamics in the different perspectives on organisational learning.

31.2.1 Professionals' Learning Through a Behavioural Perspective on Organisational Learning

Early organisational theory during the 1960s and 1970s is characterised by a focus on organisational structures as the defining elements of what an organisation is, combined with a rational understanding of how to coordinate and plan work (Scott 1998). The inspiration came from the German sociologist Max Weber and his work on ideal types of organisations (Weber 1946a, b). According to Weber (1946a),

bureaucracy is the best way to organise work because it provides the most efficient structure for meeting the societal challenges due to the simultaneous development of task complexities, increase in populations, technologies, rules and markets. In Weber's theory of bureaucracy, rationalism refers to the coordination of work as structured by rules and regulations in a division of labour guided by explicit work descriptions executed in hierarchical structures with an educational system to provide for professionals' knowledge and skills needed for the efficient bureaucracy to run smoothly (see for example Grey 2005 [2013] for an insightful account on Weber's bureaucracy).

The learning paradigm embedded in the behavioural perspective on organisational learning was developed by a group of experimental psychologists represented by Thorndike, Watson and Skinner, who (inspired by Pavlov and other physiologists) wanted to redefine psychology as a science with the focus upon behaviour as the unit of analysis (Miller 2003). This perspective was coined "behaviourism", and it constituted a departure from a critique of early twentieth century psychological ideas about the human mind. The early behaviourists regarded the human consciousness as a "black box" beyond scientific investigation. They took their point of departure in a stimulus-response model, which focused upon external factors like incentives and reactions towards them. In this original and classic account of behaviourism, changed reactions over time were understood as adaptation of behaviour to external surroundings to be stored as memories in peoples' minds. It was a behaviourist understanding of learning that influenced theories of organisational learning, when the term found its way into organisation studies in the late 1950s and early 1960s (Cyert and March 1963 [1992]; March and Simon 1958).

The underlying ideas in a behavioural understanding of organisations must be understood against the background of a neo-classical understanding of organisations as able to be managed in a fully economic rationalist way (Augier and March 2008). The organisational behaviourists found that this was not the case when they began studying the actual behaviour of organisational life and work. Here they found that organisations were primarily characterised by disagreements about goals which can never be resolved. These disagreements mean that negotiations and conflicts always have to be considered when explaining and understanding organisations (Winter 1964). Secondly, organisations are goal oriented in the sense that they adapt to behaviour that can satisfy and manage obstacles. This is called "satisficing" behaviour, which contradicted the focus upon utility maximising in a neo-classical rationality of decision making. Thirdly, concrete problems and insecurities in organisations activate or "trigger" the search for solutions and, in turn, learning. Fourthly, organisations react towards insecurities by applying standardised procedures, the so-called "standard operating procedures" (SOPs). Fifthly, standardised procedures are a central element in organisational learning because it is through the inquiry into solutions to insecurities that learning may occur, calling for a change in the current SOPs.

In other words, organisational learning comes about when organisational programmes for behaviour guided by routines and procedures do not reach expected goals (Cyert and March 1963 [1992]; March and Simon 1958). What happens then

is that inquiries are made and problems are solved, new goals are set and organisational structures are changed in order to implement new and more adequate behavioural programmes. Organisations demonstrate that they have learned something when they are able to apply routines and procedures without further problem-solving. Thus, organisational learning in this perspective is characterised by a change or development in established routines and procedures.

Two concepts are of vital importance for the behavioural perspective on organisational learning (Cyert and March 1963 [1992]; March and Simon 1958). The first is the standard operating procedures mentioned above, which refers to organisations being run by routine behaviours. Routines are identical to standardised programmes and procedures, whose purpose it is to make organisations economically feasible and efficient. The other is the concept of "bounded rationality", which derives from a critique of neo-classical economic theory in which human behaviour is understood in the light of the rationality of "economic man" (sic). In neo-classical theory, decision makers are able to acquire full information about all decision alternatives and will always make the decision that offers the best chance of maximising utility. In a bounded rationality perspective, decisions will be "satisficing". This is the best achievable decision because, it is argued, no humans are able to compute all necessary information to make fully rational decisions. In sum, organisational learning in a behaviourist perspective is characterised by the change of routines and procedures that are no longer working, done by decision makers working within the limits of bounded rationality in organisations that are continuously negotiating goals.

There are few existing studies of professionals' learning that take their explicit point of departure in organisational routines; but in health science, for instance, "standard operating procedures" is a concept that is often used to describe routinised and effective practices related to professionals' learning of surgical procedures and safety at the operating level. In a study by Deckert et al. (2007) problems encountered when providing anaesthesia in surgical procedures conducted outside the core operating area of staff demonstrated a need to optimise local requirements and special technical equipment. This was done by changing the existing standard operating procedures at the hospital in question, resulting in a change of established behaviour aimed at reducing the number of pre-operative patient difficulties.

Another example of how standard operating procedures have been highlighted in relation to professionals' learning is derived from the safety profession. Based on one of the most pertinent challenges of hosting big sports events like the Olympics, to ensure the safety and security of competitors and the public, Johnson (2008) argues for employing computer simulations as training tools to rehearse standard operating procedures before real-life drills are conducted. This example underscores the fact that standard operating procedures are the main focus for working on organisational change and learning processes, and that computer simulations can be used to encourage professionals to change their routines.

Finally, Nicolini et al. (2011) provide an example from the healthcare profession of the way in which professional organisations work with and are affected by standard operating procedures. Since medical institutions are increasingly concerned with ensuring the safety of patients, failure mode and root cause analysis is often

used as a tool to investigate clinical processes or standard operating procedures with a view to creating organisational learning. Even though Nicolini et al. (2011) study the tensions arising from using root cause analysis at policy level based on ethnographic data, they emphasise that root cause analysis is employed as an improvement method to search for errors in established standard operating procedures. The application of this method is expected to enhance the abilities of healthcare professionals during potentially uncertain situations, as well as improving levels of patient safety.

To summarise, in the behavioural perspective organisations do not constantly reinvent decisions, so the learning of professionals in organisations can benefit from an already existing efficient behaviour when they experience impacts that organisational behavioural programmes recognise (March and Simon 1958). Professionals' learning in a behavioural perspective on organisational learning is made possible by the *a priori* knowledge and expertise that professionals bring with them from their training. Our examples also show that professionals' learning originates from situations or episodes characterised by tensions and uncertainties with regard to the existing standard operating procedures residing in the professionals' organisation when interpreted in the light of a behavioural perspective on organisational learning. It is when professionals are able to activate their behavioural programmes without initiating further search or inquiry that the organisation can be said to have learned. In the above examples, standard operating procedures or routines work as stabilising elements in the organisation by *a priori* framing a fixed range of potential decisions within which professionals must operate.

31.2.2 Professional Learning in a Cognitive Perspective on Organisational Learning

The cognitive perspective on organisational learning originates from the contributions to the field made by Chris Argyris and Donald Schön (1978, 1996). In their work, they define an organisation as a political unit or a "polis" in order to emphasise that all organisations are permeated by political conflicts. In the polis organisation, organisational members act (and therefore learn) on behalf of the organisation in which organisational learning is defined as the sum of all individuals' learning. Inspired by the organisation theorist Chester Barnard, the organisation is understood as a "learning system" that adapts to changes in the environment through the reactions of its members to changes in the environment. However, the decisions of individuals regarding when and how to (re-)act depend on the organisational learning system which holds the individual and the organisation together.

The inspiration from Barnard paves the way for Argyris and Schön's (1978, 1996) conceptualisation of an organisation as a learning system with latent conflicts, formal ("structures") and informal ("motivation") elements, which as a whole affects how organisational members are able to adapt to changes in the environment and, in turn, learn. Thus, the organisational learning system consists of structures

that channel organisational inquiry. Structures are defined as the communication and information systems of the organisation; the physical environments, procedures and routines for individual and collective inquiry; and the incentive systems which influence the motivation of members to make inquiries. The organisational learning system also consists of the “behavioural world”, which is how organisational members associate with each other in an organisation. The organisational learning system can prevent productive organisational learning if the behavioural world is too dominated by the fear of losing face, resulting in defensive ways of reasoning:

A key feature of the behavioural world of an organization is the degree to which organizational inquiry tends to be bound up with the win/lose behaviour characteristic of organizational games of interests and power. (Argyris and Schön 1996: 29)

The cognitive perspective on organisational learning appears as a reaction against the elimination of mental aspects to help explain the human mind and learning in behaviourism. Through the 1940s a “cognitive revolution”, as Howard Gardner calls it in his book, *The Mind's New Science* (1987), surfaces and attention is directed towards the inner selves of humans. Cognitive psychology becomes oriented towards providing empirically based knowledge about cognitive processes as a foundation for the construction of knowledge and, in turn, human action. A cognitive perspective on learning focuses on the inner mental processes of humans such as the memory system, the development of cognitive abilities, mental models, causal maps and the computation of information. Learning happens through the structuring and modification of humans' inner cognitive or causal-functional structures, which are part of deciding actions such as “if I do X, then Y happens”. Argyris and Schön's (1978, 1996) research on organisational learning rests upon a cognitive perspective on learning. They prefer the notion of “action” rather than behaviour, and call their theoretical perspective a “theory of action”, which is one way to express the idea of cognitive modelling of the actions of individuals (Argyris and Schön 1974 [1978]).

The purpose of Argyris and Schön's (1978, 1996) model for organisational learning was to change the actions of individuals (they mostly worked with management) by demonstrating the detrimental effects of defensive reasoning with regard to the effectiveness of organisations and professionals. Argyris and Schön (1978, 1996) view defensive reasoning as the most important obstacle when it comes to learning to flourish in organisations. They define all organisations as learning organisations, but not all organisations learn in a “productive” way. “Unproductive” learning organisations are those in which defensive reasoning rules, thereby preventing the free and open exchange of information and knowledge. The background for defensive reasoning is the wish of individuals to retain control, the consequence of which is that all members of an organisation will seek to protect themselves when they experience threatening or embarrassing situations. This is because all individuals are “*programmed with Model 1 theories-in-use*” (Argyris and Schön 1996: 106). In other words, Model 1 programming makes productive learning organisations almost impossible because these ways of reasoning spread throughout the whole organisation. A change in the theories of action that (may) lead to non-defensive ways of reasoning can only take place if individuals (and in turn organisations) learn to

reason in ways marked by an open exchange of information and knowledge, which then ideally will lead to a Model 2 programming and a Model 2 learning system (Argyris and Schön 1996: 111). This change entails public testing of the assumptions through which individuals communicate, including the (often negative) traits assigned to other individuals and their actions.

In an action-research study, Vashdi and colleagues (2007) looked at how a model for learning might be helpful for a surgical department in preventing adverse events. The background for the study was that each year a large number of patients passed away as the result of medical errors, and that progress with regard to decreasing this number had been limited by a work environment that was not able to learn from its errors (Vashdi et al. 2007: 116). The study indicated that the learning model was beneficial for creating learning systems that were able to facilitate Model 2 theories of action in the department, making it possible not only to optimise the ability of professionals to detect and correct errors, but also to create a more transparent organisational learning system which was more able to question governing values and norms. In other words, the learning done by professionals was not only a question of finding and correcting errors. It also involved encompassing new ways of understanding and approaching the challenges that faced the surgical department.

For Argyris and Schön (1978, 1996), organisational learning is a continuous process mirroring the acquisition of skills and knowledge by an organisation, something which occurs by “finding and correcting errors”. They also distinguish between single- and double-loop learning. Single-loop learning is the incremental learning processes that occur when a mismatch is detected and corrected without altering the core values that rule actions (Argyris and Schön 1978, 1996). Double-loop learning takes place when a mismatch is detected and corrected via a change of the underlying values governing human action. Thus, single-loop learning adheres to the working routines while double-loop learning creates new patterns of action based on changed values. For instance, if a waste-disposal organisation is experiencing increased amounts of waste, a single-loop learning way to deal with this problem is to install yet another incineration plant, while a double-loop learning model would be to start some recycling of the increased waste. Connecting the two types of learning systems, Model 1 and Model 2 theory of actions, double-loop learning requires organisational inquiry into governing values, which will only happen in organisations that are able to implement Model 2 learning.

In a case study of how to maximise the quality of nursing practices, an organisational learning approach inspired by Argyris and Schön was employed by Clarke and Wilcockson (2001). One of the main arguments leading up to deploying an organisational learning framework was an understanding of the need to work with both professionals’ learning and organisational learning at the same time. One of the results of the study was that there are two levels of thinking amongst nurse practitioners: one that employs existing structures and systems of care delivery; and another that challenges existing systems, emphasising the need to meet the needs of the patient instead of only following procedures from the system. According to Clarke and Wilcockson (2001: 270), the latter form of thinking corresponds to double-loop learning given its focus on reconceptualising patient care and services

in trying to match the needs of the patient, while the former perspective reflects single-loop learning.

The study displayed that the improvement of practice in healthcare services needs to go beyond a focus on finding and correcting errors in the existing system. It was equally important to focus upon the close relation between professionals' learning and organisational learning to enable professional institutions to work with the local learning systems and contexts of patient care. Further, the study showed the importance of communication and information sharing and its ability to help change governing values and norms. Thus, professionals' learning was not only defined by practitioners as users of knowledge following or adhering to guidelines for an evidence-based practice. Important and valuable knowledge was also derived from the context of organisational care delivery and the professionals' work.

Summing up, the literature on professionals' learning contains a large pool of empirical research that employs the concepts from Argyris and Schön (1978, 1996), for instance Model 1 and Model 2 and single- and double-loop learning. In the two studies presented here, the importance of creating learning systems in professional institutions which are able to utilise productive single- as well as double-loop learning models was emphasised, thereby showing that it is not enough for professionals to merely learn to adapt to changes. It is equally important that their learning provides them with the abilities and possibilities to change governing values and norms in professional organisations, thereby opening up for potential new ways of understanding and solving problems.

However, even though the studies presented here indicate that organisations and professionals should preferably be able to transform governing values and norms based on a learning system that supports double-loop learning, this type of learning is not an easy task to engage in. One essential message from Argyris and Schön (1978, 1996), which has apparently not lost its explanatory power, is that people have two programmes governing their actions. The first is characterised by productive learning from a learning system that is transparent and open in its quest for valid knowledge. The second tells the story of defensive routines and unproductive learning, where the main objective is to defend existing actions. In many professional organisations, this kind of defensive response still poses a real challenge in managing professionals' learning. In other words, working with professionals' learning in the cognitive perspective on organisational learning means being aware of the two different learning systems and their consequences for professional and organisational effectiveness (Argyris and Schön 1974 [1978]).

31.2.3 Professional Learning in a Practice-Based Perspective on Organisational Learning

While the two previous perspectives on organisational learning both take their point of departure in individuals' learning, this perspective does not regard learning as a social process in organisations (Brandt and Elkjaer 2011). The move into social

processes signals a change from a dominant focus upon management as the key to creating organisational learning, to a notion of learning that includes other groups of employees and mirrors a change of work from production to service and knowledge, with learning acquiring an increasingly broad significance. Thus, in an analysis of organisational learning in a practice-based perspective, Peck et al. (2009: 23) demonstrate that the most powerful processes of learning take place outside the strategic hub in professionals' organisations. Rather, organisational learning is situated in informal professional communities of practice of which the manager is rarely a member.

Inspired by the ideas of symbolic interactionism, Marxism and the later works of Wittgenstein, we see a different understanding of "what is an organisation?" in a practice-based perspective than the accounts in the two previous sections (Nicolini et al. 2003). Notwithstanding the noticeable dominance of rational theories in organisation theory, emergent ideas on organisations in a practice-based perspective do not work with a divide between organisational members and their organisation. Organisational members are affected by historical and socio-material conditions constituting the organisation, which means that you cannot think of the individual without also including the social and material conditions for membership.

Organisational members are always embedded in and understood as part of communities which are perceived as being constituted through language, actions and artefacts. This conceptualising of organisations as practices of work which are organised around work incorporates informal social and material processes that take place at different organisational levels. Even though there are different conceptions of what defines an organisation within practice-based theories, it is a given that organisations are regarded as dynamic and complex configurations and perceived (for instance) as communities of practice, social worlds or cultures encompassing a range of activities and commitments displayed in everyday work and organisation. In this perspective on organisational learning, learning is an aspect of these organisational practices, social worlds and cultures.

The inspiration for a practice-based perspective on organisational learning derives from several epoch-making works from the beginning of the 1990s. One of the primary sources is Lave and Wenger's (1991) influential book, in which learning is understood as "legitimate peripheral participation in communities of practice". This is a concept of learning that takes the process of learning out of the individual as the subject of learning and into a social field of action and interaction in which learning is about access to participation in communities of practice (not only to practice but also to membership of an institutionalised practice). It is in participation itself that learning unfolds as a process and result. This is why access to participation becomes pivotal – instead of the individual's motivation or the transfer of knowledge from an educational context to a practice context. In this way, learning becomes connected to the patterns and possibilities of participation in communities of practice ("from peripheral to non-peripheral").

We may, however, also trace this latter perspective on organisational learning to the works of John Dewey (1929 [1984], 1938 [1986] and Lev Vygotsky (1997), who early on coined a theory of learning and knowledge in which socio-cultural,

historical and material elements are constitutive in the processes of learning. Thus, in one of Dewey's (1929 [1984]) most important reflections on learning and knowledge, *The Quest for Certainty*, he made a foundational critique of how learning and knowledge are understood in both the behavioural and the cognitive perspective. This critique also reflects the core content of a practice-based perspective on learning:

They all hold that the operation of inquiry excludes any element of practical activity that enters into the object known. Strangely enough this is true of idealism as of realism, of theories of synthetic activity as of those of passive receptivity. For according to them 'mind' constructs the known object not in any observable way, or by means of practical overt acts having a temporal quality, but by some occult internal operation. (Dewey 1929 [1984]: 18)

Dewey (1929 [1984]) criticised the quest for a complete and certain foundation for learning and knowledge in both the cognitive model of learning and in the behavioural understanding of learning. Instead, he (1929 [1984]) advocated an understanding of learning and knowledge that emphasised the importance of participation in "practical activities" in life and work as potential learning opportunities. It is this understanding of learning we find echoed in the practice-based perspective on organisational learning in the insistence on learning being part and product of the social and material history of the communities, social worlds and cultures of which participants are a part. This is why researchers and practitioners often talk about 'knowing' rather than 'knowledge' to stress the active and processual character of the knowledge concept in this perspective on learning. In addition, in a practice-based perspective on learning, the dualisms of subject and object are dissolved and replaced by a mutual constituency.

For a practice-based perspective on learning, the point of departure for learning is the patterns of participation in the practices at hand. It is important to note that the term "practice" has (at least) two meanings: "to practise" and "a practice", for example a medical practice or a teeth brushing practice both mirrors the institutionalisation of the practice practised (for elaboration, see Nicolini et al. 2003). For example doing your job as a teacher or doctor entails certain institutionalised practices of "doing" teaching and "doing" doctoring, which are included as part of the everyday practising by teachers and doctors.

Many scholars of professionals' learning have been inspired by a practice-based perspective. For example, in a study of school teachers' professional learning Hodkinson and Hodkinson (2003) employed concepts from Lave and Wenger (1991) in their case study at four teaching departments. Hodkinson and Hodkinson (2003) demonstrate that teachers' main activities focus on teaching pupils to attain knowledge, and that professionals operate in several different communities of practice. In the study, it is demonstrated that the most important community of practice is the department in which teachers participate and share their day to day activities. Further, the study illustrates that professionals learn during their breaks and lunch-time meetings, when professional problems are discussed and they have the opportunity to listen to new ideas and incorporate them into their own teaching styles. Thus, the practices of the professionals under scrutiny are characterised by an on-going development following interaction with colleagues and other core staff

members as well as the continuous development of the communities of practice derived from external pressures such as changes in government. In another study by Glazer and Hannafin (2006) of professionals' learning in the teaching profession, we find a similar pattern of situated learning opportunities in the organisation. Even though the main purpose of their study is to create a model which can promote professionals' learning, the theoretical backbone originates in reciprocal interactions in the community in which teachers take responsibility for each other's learning and development, firmly founded in Lave and Wenger's (1991) situated learning theory (Glazer and Hannafin 2006).

Another contribution to a practice-based perspective on organisational learning is made by Brown and Duguid (1991) in an article in which they stress organisational learning as a process through which organisational members become knowledgeable rather than acquiring knowledge (Brown and Duguid 1991). Brown and Duguid (1991) show how organisational learning is grounded in the non-canonical practices that escape descriptions of standard operating procedures and cannot be captured by mental models of action but only in practising a practice in an organisation. A third important contribution for a practice-based perspective on organisational learning is made by Cook and Yanow (1993) and manifested through changes of values, beliefs and emotions explicated through changes of language, artefacts and actions (Cook and Yanow 1993). Where Brown and Duguid (1991) take their point of departure in the sociology of work, the point of departure for Cook and Yanow (1993) is anthropology and a cultural understanding of organisations in which learning is a change of an organisational culture (see also Smircich 1983).

Looking into organisational culture, Waring et al. (2007) investigate how a safety culture can be developed in healthcare services. The premise for the study is that the creation of a safety culture in healthcare services has been an important policy aim for many years now (Waring et al. 2007: 3). Based on ethnographic data, the researchers display how important it is to explicate ritualistic behaviour in organisations as a marker for the underlying organisational culture and as a significant factor associated with safety in healthcare services, something to which most patient safety research tends to pay very little attention. The results of the analysis illustrate that mutual and culturally informed social practices in the professional culture have significant implications for patient safety (Waring et al. 2007: 7), viewed in the light of the assumptions of professionals with regard to safety culture and risk. Further, organisational learning and changes in professional culture are closely tied to various types of social and organisational factors, which means that professional organisations need to change their culture if they wish to change the assumptions that they take for granted.

From what has been proposed above, it is possible to present a practice-based perspective on organisational learning as founded upon three basic principles, which are by and large inspired by pragmatist philosophy and socio-cultural psychology. First of all, the understanding of causality is transactional, which means that all actions and relations are situated and mutually constituent. It is not only a case of A influencing B or B influencing A. The situation and the wider socio-material world of the situated activities also have voices and are part of transactions.

No phenomena can be understood independently of other phenomena, which is why a practice-based perspective on organisational learning is understood as an aspect of social, historical and material worlds.

Secondly, dualisms are rejected as a way to analyse phenomena. In a practice-based understanding there is no distinction between body and consciousness, facts and values, objective and subjective, individual and organisation because the unit of analysis is practice. This means that the relation between individual and organisational learning is no longer an issue (“how is individual learning to become organisational learning?”). Learning in a practice-based perspective does not begin in the individual, but departs from participation in and practising a practice. In this understanding, the individual and the context are closely woven together and analytically inseparable.

Thirdly, practice, or changes of practice, makes up the foundational unit of analysis for organisational learning. In this understanding it is stressed that practice is the primary factor when we want to understand what an organisation is and how it learns. A practice-based perspective on learning is a critique both of the individual as the subject of learning and of mental modelling as the focal point of learning (see also Fenwick et al. 2011). Thus, this perspective problematises both an understanding of individuals as travelling “containers” consisting of mental models, and an understanding of knowledge and organisations as standard operating procedures and routines. By contrast, a practice-based perspective understands professionals’ knowledge and knowing as emergent features instigated from acting and participating in communities of practice. Knowledge is thereby embedded in situations in which knowledge is created and applied (Cook and Brown 1999).

A practice-based perspective on organisational learning and, thus, a point of departure in the social, historical and material processes for learning in enterprises has gained increasing recognition over the years, and has advanced our framework for understanding and explaining learning and change in organisations (see e.g. Easterby-Smith and Lyles 2011). The advancement may be due to the development of work and enterprises, which has made processes more complex so that you cannot only rely on individuals’ cognitive and communicative capacities and standard operations for running enterprises. Instead, it is necessary to begin with the practice of enterprises and their organisation.

31.3 Conclusion and Discussion

For many years there has been considerable concern regarding the adequacy of the way in which professionals learn their work practices, and this concern has often focused on the training and knowledge of professionals. In this paper we have connected professionals’ learning with professionals’ organisations in order to discuss what it means for professionals to be in transition from a model of occupational professionalism to organisational professionalism as described by Evetts (2011) and others (Muzio et al. 2011). This is a transition from professionals as framed first and

foremost within their own professional knowledge and associations, to being part of and interacting with organisations and other groups of professionals in an atmosphere of doubt about the legitimacy of professionals' knowledge.

Looking back, the first concern with professionals' learning was that educational institutions did not provide sufficient education for professionals working in practice. This is sometimes termed the "theory-practice gap" (Reed 2009), and it leads to concerns about whether transfer between education and work is possible (see for example Detterman and Sternberg 1993; Gherardi and Nicolini 2003). Another concern was whether professionals are able to learn everything in educational institutions, leading to the model of the reflective practitioner as a way to acquire knowledge about professional work through actions at work (Schön 1983, 1987).

Today, the issue of professionals' knowledge and how to make it match professionals' work practices continues to be a concern for educationalists working with professionals (see e.g. Jensen et al. 2012). In addition, there are calls for a definition of what it means for professionals to be part of workplaces and of new ways of organising and managing work in enterprises, which we have written in the above. This is the background for our chapter, and it is the implications of this situatedness of professionals in organisations that we have addressed by incorporating the field of organisational learning. In other words, we set out to remedy the lack of input from organisation studies by including the field of organisational learning to bring in not only professionals' work but also the dynamics of organisational practices and learning.

Mintzberg (1983) did the same thing about 40 years ago, but in those days professional work was more in line with the occupational professionalism Evetts (2009) talks about. This means that the image of professionals' work back then involved professionals being perceived as their own managers, lonely working people in a decentralised organisation. It was only possible to uphold this image because professionals were highly skilled experts within their fields who also took care of their own learning mediated by educational institutions and more experienced colleagues (Mintzberg 1983). There are still remnants of these patterns, but they are not the only ones that professionals work in. New groups claim professionalism (for example teachers and nurses), blurring boundaries of what it means to be a professional (Fournier 2000), and all groups of professionals are increasingly required to work with other groups of professionals, in work organisations blurring the boundaries of professional knowledge (Fenwick et al. 2012a). In addition, the monopoly of what constitutes legitimate knowledge held by professionals is questioned both by external knowledge producers that define evidence-based knowledge (Grimen and Terum 2009) within different professional industries like education and healthcare, and by the demand for not only professional responsibility but also professional accountability, which is often understood in economic terms (see for example Freeman et al. 2009; Møller 2009).

It is these transitions of professionals' work that make organisational contexts and the dynamics here relevant. We have chosen to look at how the field of organisational learning may help us look at professionals' learning. In this endeavour, we have taken our point of departure in a rephrased question from a classical

contribution within the field of organisational learning, Argyris and Schön (1996: 3) and with help from them we have asked: "What is an organisation that professionals may learn?" What we have done is ask how the framing of organisations matters for professionals' learning.

We have considered three organisational learning perspectives on organisational learning: behavioural, cognitive and practice-based. These are perspectives that reflect different historical times and understandings of organisations, learning and organisational learning. When we looked at professionals' learning through the lens of a behavioural perspective on organisational learning, the organisational focus was on the behavioural programmes mirrored in the routines and procedures. Professionals' learning in this perspective is about changing inadequate routines and procedures when they are no longer working. Then inquiry is initiated with the purpose of re-organising routines and procedures to serve purposes of efficiency and quality (responsibility).

Professionals' learning in the light of a cognitive theory is about defensive routines inhibiting processes of detecting and correcting erroneous actions as well as more deep-seated professional learning processes oriented at changing governing values and norms in an organisation. With regard to professionals' learning, we have distinguished between single- and double-loop learning. In a cognitive perspective, we have demonstrated that the learning of professionals is dominated either by a productive learning mindset, or by an action-theoretical programme characterised by transparency and the free exchange of knowledge and information. An unproductive mindset, on the other hand, was characterised by holding back knowledge, thereby impeding professionals' learning.

In the practice-based perspective on professionals' learning, the focus is upon the organising processes of work practices through participants' patterns of access and participation in these. In this perspective learning is part of practice and the focus is upon the continuous construction and reconstruction of these practices. This is also a focus upon how different participants (for example different groups of professionals) form and perform communities (Gherardi and Nicolini 2002), networks (Latour 2005), events (Strauss 1993), activity systems (Blackler et al. 2000), or action nets (Czarniawska 2004), and upon learning as triggered by emotions, ambiguities, uncertainties, etc. (Brandt and Elkjaer 2011). This transcending the individual as the 'unit of analysis' for professionals' learning, we believe, is helpful in understanding professionals' learning when we want to include work, workplace and organisations. We further believe that this perspective needs supplementing by pragmatism to remedy the overly focus upon socialisation and institutionalisation that tend to be inherent in a practice-based perspective on learning (Elkjaer 2009; Fenwick 2003). We shall return to this point in a moment. But let us first imagine what would be a perspective on professionals' learning without an organisational perspective. This would, we believe, take us into issues of what sorts of knowledge and competencies is needed given the changes of professionals' practice, and how to best prepare educational institutions and professionals themselves for these transitions.

The issue would be which new skills to learn, and professionals' knowledge would in this line of reasoning have to be complemented with skills and knowledge

of how to handle working in organisations. Learning these new skills would cater for the demands for more collaborative ways of working and for learning to work in organisations managed by people other than professionals themselves. The developments of new competencies would probably put emphasis on competencies that are necessary to the “professional-client” relationship. Technological literacy, for instance, or the ability to use new accreditation tools as well as collaborative competencies in order to co-operate not only horizontally in the organisation with peer groups but also vertically with managers, associations, new occupational groups, etc. Professionals would probably also learn new work strategies, as well as learning to negotiate with managers and political stakeholders with regard to relevant professional subjects such as performance indicators, standardisation, audits and measurements – all subjects which have been brought into professionals’ work and life in organisations. We see this development reflected in the growing demand for including subjects on “organisation and management studies” in all kinds of training courses for professionals.

This focus, however, stays within the logic of professionals’ learning that is closely connected to the educational system and the control of professionals’ educational attainment through formal learning initiatives. The focus is relevant, but bringing in an organisational perspective, particularly an organisational learning one, puts other issues on the agenda. These are issues, we believe, that touch not only upon knowledge and reflection but also upon being and becoming part of organisational life and work.

This can be done in a phenomenological and “life-world” perspective with a point of departure in the meaning and intentionality of work for professionals and their competencies (Sandberg and Dall’Alba 2009; Sandberg and Pinnington 2009). One could, however, also elaborate a practice-based perspective with its current focus upon sociality and induction of professionals in organisations to include a socio-material understanding of organisations (Fenwick 2010; Latour 2000, 2005). This understanding, we believe, would have to be elaborated with an understanding of learning as departing not only from individuals but also from uncertain situations (Elkjaer 2009), from “assemblies” of matters of concern including both human and non-human actors and intermediaries. Models of professionals’ learning in this understanding could involve practicums in which *re*-reflection was not the main issue but that of *anti*-cipating and dealing with organisational complexities as transactions in which time, space, task and participants are all a part. The focus would not be on intentions and motivation, but rather upon performativity and power.

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Chapter 32

Professional Learning in the Ambulance Service

Morten Sommer

Abstract Professional ongoing learning is becoming recognised as being as important as the initial preparation for occupational practice. Yet, how ongoing learning in professions can be organised and enacted in ways that effectively addresses the changing requirements of work has become a vexed issue. One consideration that is attracting growing interest and gaining credibility is for much of this ongoing development to occur through and be part of everyday work activities and practices, albeit these experiences being augmented by educational interventions (when required). Ambulance personnel provide an example of need to engage in continuous learning throughout their working lives, thus highlighting the importance of identifying how this learning can best be promoted. This chapter describes and discusses a study examining professional learning in the ambulance service. The findings are based on participant observation, where the aim was to be informed by what the data suggests rather than prescriptive accounts of how ambulance personnel should learn in their workplace and work practice. The findings demonstrate that both learning through practice and learning through educational activities are crucial for ambulance personnel's professional learning. These two kinds of experiences fulfil different learning needs, and are held to be complementary. In addition, the study supports the need to use a combined approach to learning (i.e. combining the individual cognitive approach and contributions from the social world) when explaining learning related to professional practice and work. In all, the case made across this chapter suggest that this combined approach to learning can enhance our understanding of workplace learning and that an emphasis on learning both through practice and through educational activities can potentially improve the process of continuous learning throughout individuals' working lives.

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32.1 Introduction

Professional learning in workplaces has been the subject of growing interest in recent decades. Rather than assuming that educational provisions or training programs alone are the most effective means for such development, practice-based options are now being considered. This interest is also the case for learning in emergency response organisations, with a range of studies showing that emergency personnel's learning and development of occupational competence is situated and part of everyday life in their organisations and workplaces (e.g. Campbell et al. 2009; Goldman et al. 2009; Lloyd 2008; Lloyd and Somerville 2006; Lundin and Nuldén 2007; Sommer and Njå 2011, 2012; Taber et al. 2008). Taber et al. (2008), for instance, found that paramedics and fire-fighters rate learning in their daily work above initial qualification training: "it is in their practice that fire-fighters and paramedics truly understand their professional work" (p. 283). Hence, these authors concluded that development of understandings through work experiences is paramount to emergency personnel's successful performance in emergency situations. Emergency personnel's ongoing professional learning is, thus, crucial.

An example on professionals needing to engage in continuous learning throughout their working lives is ambulance personnel. Ambulance services are a critical component of every nation's health care system. They provide out-of-hospital acute medical care and/or transport to definitive care for individuals with illnesses or injuries. Ambulance personnel is the collective term used to denote individuals who are trained and certified to provide pre-hospital, immediate medical care to patients in emergency situations, such as automobile accidents and heart attacks. Ambulance work as an occupation is, however, relatively recent. Prior to the 1970s, the function of ambulance services was to transport patients, without providing any medical care of importance, to the nearest source of medical treatment (doctor or hospital). From that time to the present, however, there has been an unprecedented expansion in "out-of-hospital" care delivery (Craggs and Blaber 2008). Currently, ambulances in many countries can be characterised as rolling emergency rooms and pharmacies, and ambulance personnel are expected to deliver a high level of medical care. Nevertheless, medical science is still evolving fast. New and better treatment procedures are constantly being introduced, along with more advanced technological equipment. This development puts great demands on ambulance personnel's learning. Thus, to deliver high-quality health care, medical professionals need to keep on learning as part of their everyday work across their working lives (van de

Wiel et al. 2011). For instance, nurses studied by Skår (2010) reported a constant need to gain new knowledge and develop their practice to stay current with new developments in nursing. Ambulance services and health care delivery systems in general, therefore, represent an important domain for studying individuals' professional learning throughout their working life.

But what do we actually know about learning and development of competence in workplaces? Researchers focussing on workplace learning do not necessarily agree on how to understand the concept of learning, either as a general proposition or as related to professional practice and work. Several scholars, however, have identified two distinct premises for understanding the concept of learning (see e.g. Beckett and Hager 2002; Hager 2004, 2011; Sfard 1998). Firstly, the *individual cognitive approach* (cf. Sfard's 1998, *acquisition metaphor* for learning) focuses on individuals per se, where learning is understood as the individual's process of acquiring information and reasonable behaviour. This approach to learning has largely shaped formal education systems (Hager 2004). Secondly, the *socio-cultural approach* (cf. Sfard's 1998, *participation metaphor* for learning) focuses on the social relations between people rather than on the individual in isolation. Learning is thus understood as a process of participation in work-related activities and interaction between colleagues (e.g. Billett 2010; Campbell et al. 2009; Collin 2002; Eraut 2007; Goldman et al. 2009; Lave and Wenger 1991; Lloyd and Somerville 2006; Lundin and Nuldén 2007; Taber et al. 2008; Wenger 1998).

Both approaches to learning give reasonable explanations of how individuals learn at workplaces. However, they also have limitations. The individual cognitive approach is criticised for viewing learning as an individual activity, seeing learning as separated from (and to some extent opposed to) any other activities in organisations (Gherardi et al. 1998). The socio-cultural approach, on the other hand, is criticised for underestimating the individual's role in learning (Filstad and Blåka 2007) and for not offering accounts of how new knowledge is produced and learned (Edwards 2005). Consequently, the two approaches' ability to comprehensively explain learning in the workplace is still debated and examined (see e.g. Hager 2008; Hodkinson et al. 2008; Mason 2007), and more research on the topic is necessary. For instance, van de Wiel and Van den Bossche (2013) state that a closer examination of work-related learning activities is needed to better understand expertise development and the interaction between implicit and intentional learning. Equally, Boud and Hager (2012) call for studies of how professionals actually learn at work (that is, "the learning possibilities of work and what kinds of learning everyday participation in practice does and does not generate"; p. 28) to improve continuing professional development.

This chapter examines professional learning in the ambulance service. It commences by outlining the theoretical framework on learning in emergency response work that guided the study, then it describes the study approach and presents the findings, and finally it discusses the findings and draws conclusions. It argues that learning experiences in both practice and educational settings are of importance for ambulance personnel's professional learning throughout their working life.

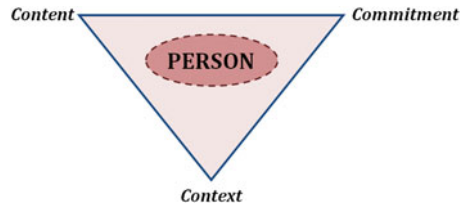
These two kinds of experiences fulfil different learning needs and therefore complement each other. It also argues that a combination of the two approaches to learning (learning as acquisition and learning as participation) is useful to explain individuals' learning in the workplace.

32.2 Learning in Emergency Response Work

Clements and Mackenzie (2005) define competence in pre-hospital care as having the ability to operate to an adequate and safe standard. This means doing the right things at the right times, in a way that is to the best for the patient. Hence, there are situational requirements that need to be assessed and responded to adequately. In acute medicine, a patient's survival depends on the medical knowledge of caregivers, whether the caregivers have received good and efficient training, and how the medical care is organised and given to the patient (Chamberlain and Hazinski 2003; The Laerdal Foundation for Acute Medicine 2011). Thus, ambulance personnel's competence is a result of both *what* they learn and *how* they learn. The literature on crisis and emergency management widely acknowledges that effective decision making during a response is important for the quality of outcomes (e.g. Boin et al. 2005; Burke 1997; Burke and Hendry 1997; Flin 1996, 2001; Flin and Arbuthnot 2002; Rake and Njå 2009; Tissington 2001). A decision can be defined as "a commitment to an action that is intended to yield satisfying states of affairs for particular parties" (Yates 2003, p. 24). In other words, before ambulance personnel can provide care to a patient, they must decide *what* actions to take. Then, after a decision has been made, the actions must be carried out promptly and firmly to ensure timely medical care. Learning to make adequate decisions in emergency situations and perform the subsequent actions efficiently is therefore essential in the development of competence and professional capability in pre-hospital care.

A study of learning amongst fire-fighters shows that both socio-cultural elements, including situational factors, and individual aspects need to be considered if we are to understand how individuals develop competence in emergency response work (Sommer and Njå 2011). This is supported by Illeris (2007, 2011), who argues that learning depends both on social interaction between individuals and their environment *and* psychological processes within individuals themselves. Contextual or situational factors have a great influence on access to information from where an individual can learn (Dekker et al. 2008; Eraut 2004; Lave and Wenger 1991; Wenger 1998). At the same time, individual mental processes are central in the transformation of new information into skills and knowledge (Baddeley 1999; Bandura 1977; Piaget 1972/1997), thus making introspective processes such as reflection a crucial activity (Boud et al. 2006; Moon 1999; Ormrod 2008). Consequently, arenas for learning, how information is made available and accessed, and individuals' embodiment must all be analysed to understand learning processes (Sommer and Njå 2011).

Fig. 32.1 Individual's learning depends on content, context, and commitment (cf. Braut and Njå 2010; Sommer et al. 2013)



To guide this study of learning amongst ambulance personnel, a combination of the socio-cultural approach (i.e. learning as participation) and the individual cognitive approach (i.e. learning as acquisition) were advanced as bases for progressing. Consistent with this combined approach, individuals' learning can be considered to depend on the three elements *content*, *context*, and *commitment* (Fig. 32.1) (a triad of elements introduced by Braut and Njå 2010; see also Sommer et al. 2013).

For individuals to learn there must be *something* for them to acquire. This something will be the content of what is being learnt (i.e. the information and skills that emerge through experiences and/or introduced knowledge). The content of learning can for instance be specific skills, a certain kind of behaviour, how to understand and interpret situations, or the use of tools and equipment. The context represents the learning environment (where the learning takes place). According to the socio-cultural approach to learning, participation and interaction between colleagues are vital for learning. Environmental factors and contextual features will thus influence individuals' possibilities to learn. Finally, individuals' commitment (i.e. involvement in learning activities) will have a strong influence on what is being learnt, or if anything is learnt at all. According to the individual cognitive approach, individuals' mental or physical activity is crucial for learning to occur. And, according to the socio-cultural approach, involvement in work-related activities through active participation and interaction are necessary for individuals to learn.

32.3 Studying Ambulances Personnel's Learning

In this section, the process and outcomes of the case study approach using fieldwork to provide "depth" and understanding of work activities and workplace context in the ambulance service (cf. Flyvbjerg 2011; Yin 2009) are described and discussed. The aim of the study was to be informed by what the data suggested rather than a prescriptive account of how ambulance personnel continuously learn. During the fieldwork, I engaged with the ambulance personnel in their own environment (cf. Hobbs and Wright 2006) and collected data through a combination of participation, observation, interviews and document studies (according to Wolcott 2008, among others, the research methods most often used during fieldwork). This research approach allowed opportunities to access and appraise the ambulance personnel's skills, knowledge and work activities, in addition to the contextual and cultural conditions within the ambulance service. Doing fieldwork enables the researcher to

become part of the natural environment at the workplace, acquire first-hand experience of naturally occurring events, get an intuitive understanding of what was going on in the workplace, and develop sufficient insight to ask relevant questions (cf. Bernard 2011; DeWalt and DeWalt 2010; Fangen 2010; Hobbs and Wright 2006; Wolcott 2008). Collecting data through fieldwork also reduces the problem of reactivity, such as people changing their behaviour when they know they are being studied or telling the researcher what they think they “want” to hear (Bernard 2011; Miles and Huberman 1994).

32.3.1 The Ambulance Service Studied

The study was conducted in one of the largest ambulance services in Norway, covering 330,000 inhabitants in their field of responsibility and which responds to about 30,000 call-outs yearly. In total, the ambulance service consists of 9 ambulance stations and about 150 ambulance personnel (with a low turnover). The fieldwork was enacted at an ambulance station in the most densely populated area of the region, covering 165,000 inhabitants and responding to about 12,600 call-outs yearly. Here, the workforce consists of 34 persons divided into six work groups, in addition to apprentices and individuals working as temporary ambulance personnel (taking extra shifts at more or less regular intervals). Two work groups are on duty simultaneously during the daytime (when the number of call-outs and other assignments are highest), and one in the evening and night. Each work group staff two ambulances and each ambulance is crewed by two persons. The personnel do not formally rotate between the work groups, but the day and night shifts rotate.

Ambulance personnel’s initial training consists of 2 years of training at vocational school, followed by a 2-year period of apprenticeship. During their apprenticeships, candidates receive training in fundamental health care, emergency medicine and emergency medical treatment (related to both illnesses and injuries), and operational issues related to management of pre-hospital situations. After the apprenticeship examination, a candidate is authorised as an Emergency Medical Technician (EMT) and qualified to provide medical care at a basic level (i.e. Basic Life Support – BLS). EMTs are, thus, allowed to perform procedures that are generally non-invasive, such as bleeding control, ventilation with a bag valve mask, oxygen administration, splinting, and basic cardiopulmonary resuscitation (CPR). Authorised EMTs, after they have worked for a few years as an EMT, can undergo additional training to become a paramedic. This can either be in-service training or a 1-year college course, which both qualify candidates to provide medical care at an advanced level (i.e. Advanced Life Support – ALS). Paramedics can, therefore, perform more advanced and invasive procedures, such as intubation, intravenous therapy and administration of medications, and can function as medical leaders at accident scenes comprising coordination of the ambulance personnel’s work when several emergency agencies and/or ambulances are involved in the same response.

The ambulance service studied requires each ambulance to be crewed by minimum one paramedic. This requirement is higher than that stipulated in the legal regulations, which requires ambulances to be crewed by at least one EMT. However, in general, EMTs can be characterised as skilled ambulance personnel, whereas paramedics can be characterised as highly skilled.

32.3.2 *Data Gathering*

The fieldwork lasted 1 month, during which I participated in the ambulance personnel's activities and followed the daily work at the ambulance station. Because I lacked the necessary qualifications to hold any positions in the ambulance service (EMT or paramedic) I could not act as a fully operating participant and carry out ambulance work. Instead, I closely observed the ambulance personnel, mainly focusing on what they did and how they interacted, when they responded to incidents and patients (sometimes, however, giving a helping hand to lift patients or carry equipment) and when they carried out training activities. Between responses, I participated in the social activities and daily tasks such as preparation and maintenance work at the station. On these occasions, I frequently asked questions in the form of unstructured interviews (i.e. spontaneous and informal conversations). In addition, the ambulance service provided access to various documents, such as procedures, initial and additional training program and literature, systems for regular training and continuous education, and plans and arrangements for multi-casualty collaboration exercises. This combined approach provided the opportunity to elaborate on information that emerged during interviews, observations, and document studies.

Access to collect data was obtained by presenting the purpose and practical aspects of the study for the leaders of the six work groups at the ambulance station (after approval from the chief of the ambulance service), who all accepted the study. Which work groups and EMTs/paramedics I followed were random, depending on who was on duty when I was observing. None of the personnel expressed any reluctance or appeared to be affected by me as a researcher being present. Actually, many of the ambulance personnel expressed that they were used to have "outsiders" following them because they often had other health personnel or visiting students with them on duty and call-outs. Throughout the fieldwork period, I talked with almost all of the ambulance personnel at the station and followed about half of them out on responses, and took notes whenever possible. More comprehensive and supplementary field notes were, however, written up at the end of each day's fieldwork.

When collecting the data, three elements (i) content, (ii) context and (iii) commitment (cf. Fig. 32.1) were the key focuses. Examples of data about each of these elements are as follows. *Content* is how the ambulance personnel worked when they responded to incidents and patients, the skills and knowledge they valued, the contents of procedures, the initial and additional training program and continuous

education, and what kind of information was exchanged verbally or in written on a regular basis. *Context* comprises all of the activities taking place in the ambulance service (both defined learning activities and other activities), the characteristics of the social and cultural environment at the station, and how the ambulance personnel worked together and otherwise interacted. *Commitment* is held to be which activities enabled the ambulance personnel to carry out practical tasks (i.e. get involved bodily) and/or reflect over the content of their work (i.e. get involved mentally), and how the ambulance service arranged for and emphasised personal involvement and interaction between the personnel.

By using a combination of interviews, observations, and document studies, different and complementary data was obtained. To confirm the findings, I constantly reflected upon my observations and confronted the EMTs and paramedics with these reflections. In this way, various working hypotheses about ambulance personnel's learning during the fieldwork could be tested. After the fieldwork, semi-structured interviews were conducted with the manager responsible for the regular training and continuous education and the most senior training instructor. These interviews were administered partly to confirm information from the fieldwork and partly to collect additional information about the systems for training, education and quality assurance. To analyse the collected data, a process of open and axial coding was used (cf. Saldaña 2009). The main categories that emerged during the data analysis were related to which skills and knowledge were needed by the ambulance personnel, which learning activities took place within the ambulance service, how valuable the different learning activities were, and which contextual features influenced the ambulance personnel's possibilities to learn. This resulted in an overview of the essential skills, knowledge and experiences needed by ambulance personnel and the learning that occurred through practice and through educational activities.

After the study was completed, the findings were presented to the ambulance service. The ambulance personnel then recognised themselves in the description of how they continuously learn throughout their working life.

32.4 Essential Skills, Knowledge and Experiences

Several EMTs and paramedics stated that it is important for them to have medical knowledge (i.e. theoretical knowledge in medicine and medical treatment) as a basis for performance in their work, but ultimately practical experience is decisive. Medical knowledge is indispensable for being able to effectively treat patients with illnesses or injuries. The ambulance personnel affirmed that to be able to provide adequate care and give efficient treatment to patients, a necessary prerequisite for them is to understand how the human body works and how illnesses/injuries affect the body. These personnel, especially the paramedics, clearly demonstrated comprehensive medical knowledge. However, theoretical knowledge alone is not

enough. Many of the ambulance personnel emphasised that the work they do is very practical. “We have to think practically and solve practical problems” was a much-reiterated comment. As one EMT said:

Some of those beginning in the ambulance are typical theoreticians and not very practically inclined. They don't last long. To succeed in ambulance work you have to be able to put theory into practice.

Ambulance personnel need practical experience to become good at the operative part of their work. One paramedic stated that: “to get skilled you need to do things over and over and over again”. Experience and practice is necessary for two main reasons. First, ambulance personnel need to know the various treatment procedures by heart. In their view, substantial individual hands-on training, preferably on patients in out-of-hospital settings (i.e. real incidents), is necessary for them to get the details of the procedures in their fingertips. This ensures that the behaviour in time-critical and stressful situations (i.e. when patients are in need of immediate care) becomes automatic. One paramedic explained: “only when you know the details of the procedures in your fingertips will you have the capacity and possibility to focus on other things, such as keeping an eye on the circumstances around the patient, planning ahead, assigning tasks to others and instructing them what to do”. Second, ambulance personnel need to be capable of coping with emergency medical situations as a whole. The paramedics especially emphasised that treating patients in out-of-hospital settings is not only about carrying out medical procedures. A successful treatment also requires skilfulness in assessing pre-hospital emergency scenes (e.g. “reading” the situation around the patient and gathering relevant information), recognising various illnesses and injuries (i.e. looking for symptoms and interpreting the symptoms that are present), taking care of patients (i.e. giving both medical and mental care), looking after anxious relatives (e.g. calming them down), dealing with bystanders (e.g. preventing them from interfering or getting them to help if necessary), and working as a team (i.e. cooperating with other ambulance personnel and doctors that may be on scene). Essentially, all this has to be done in situations that may be characterised as time-critical and stressful. One paramedic explained:

Inexperienced EMTs easily become stressed, and then they tend to focus mostly on the medical part and accomplishment of procedures. But calming the patient down is also very important. If you are stressed and don't have control over the situation, it will rub off on the patient. But if you stay calm the patient will be relieved, and everything runs much more smoothly. With experience it becomes easier to be in control of emergency situations. Experience enables you to see the whole picture and plan ahead.

A combination of medical knowledge and practical experience is thus a prerequisite for a person to develop into a skilled EMT/paramedic. Both forms of knowledge – theoretical and practical knowledge – are fundamental for individuals to become vocationally and professionally capable (Lum 2009; Winch 2010). “In the beginning I was only ‘two helping hands’”, an EMT stated, meaning that before she gained any experience she was only able to carry out the technical part of the work (i.e. conducting medical procedures and assigned tasks). By responding to real

incidents and interacting with more experienced EMTs and paramedics, the fresh EMTs gain relevant experience and gradually learn to cope with every aspect of emergency medical situations. The value of experience was emphasised by most of the EMTs and paramedics. According to one paramedic, it takes about 10 years to gain sufficient experience and become self-confident enough to be considered highly experienced: “It usually takes this long time before you have been involved several times in most of the different situations that we meet in the ambulance”. Developing competence in pre-hospital care, understood as having the ability to operate to an adequate and safe standard and to do what is best for the patient in every situations (Clements and Mackenzie 2005), follows a process of first learning medical knowledge, then to carry out treatment procedures, and finally to cope with emergency medical situations as a whole. This process is in accordance with the way individuals are known to develop expertise, by moving from a novice who rely solely on rules and procedures to an expert who mainly rely on intuition and tacit knowledge (see e.g. Dreyfus and Dreyfus 2005; Ericsson 2004; Salas et al. 2010; Sternberg et al. 2000). The learning of effective rules and procedures, therefore, are of great importance for practice and learning in ambulance work, but development of competence requires a certain amount of practical experience in addition.

32.5 Learning Through Practice

Much of ambulance personnel’s learning takes place through participation in work activities during their everyday work. The data analysis revealed that guidance, occasional discussions, and feedback on responses are the three main categories of learning through practice in the ambulance service.

32.5.1 Guidance

Almost without exception, the ambulance personnel working together in an ambulance crew are qualified to provide medical care at different levels and have varying degrees of experience. The one with the least amount of training and experience therefore, either consciously or unconsciously, comes under guidance by the more experienced paramedic. The 2-year period of apprenticeship is the most organised form of guidance. In their first year as an apprentice, new EMTs function as an extra member of the ambulance crew (i.e. a third person with no personal responsibility), and the second year they work as the second member of the crew (i.e. being the partner of a paramedic). Each apprentice has an assigned paramedic responsible for them and their training (i.e. a senior paramedic designated and trained for the task), which they usually follow. However, apprentices also engage with other paramedics on occasions, meaning that apprentices receive guidance from several different paramedics throughout the period of apprenticeship. During the 2-year period,

apprentices undergo some training and education experiences (such as courses, lectures, and self studies), but mostly they learn through interaction with other paramedics. “An apprentice’s best learning comes through real work out in the ambulance” was a much-reiterated comment. Both experienced EMTs/paramedics and inexperienced apprentices stated that apprentices learn a lot through observing how paramedics treat patients and cope with emergency medical situations, and then doing things themselves under guidance. I observed many times that apprentices treated the patients while the paramedics monitored the situation from the sideline and occasionally intervened in the treatment or asked “Have you remembered to...”

This kind of guidance is, according to the socio-cultural approach to learning, a necessary prerequisite for individuals’ learning in relation to work (see e.g. Hager 2011; Lave and Wenger 1991; Wenger 1998). Hence, participation and interaction enables the apprentices to acquire the situated knowledge in terms of artefacts and established practice (cf. Filstad and Blåka 2007; Säljö 2002; Wenger 1998). The guidance of apprentices does not, however, happen by chance. Instead, it is intentionally structured, taking the apprentices from the status of peripheral participation to becoming a fully fledged member of the workplace community (cf. Lave and Wenger 1991). In other words, the guidance is structured and goal-directed to give apprentices access to the learning experiences needed to become skilled, which, according to Billett (2006), can be described by a workplace curriculum. This form of structured guidance appears to be acknowledged by emergency medical professions in general, where mentoring usually is an integrated part of training and educational programs (see e.g. Armitage 2010; Brown et al. 2012; Huybrecht et al. 2011; Jones et al. 2012).

After the period of apprenticeship is completed and the apprentices are authorised as EMTs, they continue to work together with paramedics until they themselves become a paramedic. Hence, guidance still occurs, but not as in such an organised form as in their early stages of preparation. I observed some episodes where a paramedic instructed an EMT or a less experienced paramedic, reminded him or her what to do, or took over the treatment. One example of this occurred during a response to a case of a small child with a broken wrist. The EMT in charge of the treatment apparently felt insecure about what kind of, and how much, pain relief medication to give (because children have a lower tolerance limit than adults), and how to reposition the broken wrist (because pulling as hard as on adults may harm a child). She, therefore, asked the more experienced paramedic for his opinion. He then gave advice on what to do and took control of the repositioning.

As part of the ordinary interaction between ambulance personnel during responses, when treating patients, it is both common and acceptable for them to ask each other questions, provide suggestions as to what should be done, and discuss how to respond. Guidance is thus exercised when needed (and available), as in the example with the child. “It is important to remember that we are dealing with human lives, so we always have to make sure we do what is best for the patient”, an EMT and a paramedic agreed. Therefore, not only inexperienced apprentices receive guidance but also experienced EMTs/paramedics. This is supported by other studies, showing that e.g. peer coaching (Sekerka and Chao 2003), peer mentoring

(McManus and Russell 2007) and professional dialogue (Skaalvik et al. 2012) contribute to learning and development. Guidance, in one way or another during work, consequently results in learning experiences that only are available in work related practice settings, because these experiences emerge as a direct response to occurrences and actions taken in real time.

32.5.2 Occasional Discussions

Ambulance personnel interact and talk with each other much of the time on duty. These occasional discussions, i.e. various conversations after and between responses, have an informal character, and contribute significantly to ambulance personnel's learning. One paramedic claimed: "We learn a lot from discussing with each other!"

After responses to emergency situations, ambulance personnel usually discuss their performance. They discuss what was good about their response and what was not so good. An example of this was a discussion between a paramedic and an EMT on their response to an elderly man who had fallen off a ladder and injured his shoulder. The first issue they discussed was why they did not immobilise his head/neck. Normally, patients exposed to physical traumas should be totally immobilised. But in this case the paramedic in charge of the treatment chose not to do that. The man had fallen from a relatively low height and only felt pain in his arm and shoulder, not in his neck. So, there was no reason to suspect any damage to his neck. They, therefore, agreed that they had acted correctly, and that immobilising the patient would have been excessive. The second issue they discussed was related to hypothermia (i.e. low body temperature). "I should have cut off his clothes right away" the paramedic in charge said. The man's clothes were wet from his lying out in the snow, and by the time he got to the hospital he was losing body heat. They engaged in self-criticism for not taking action early enough to prevent the man from getting cold. Post-response discussions, like the one in this example, are, in general, considered by the EMTs and paramedics to help clarify what could be improved. Hence, it enables them to learn through appraising their performance (cf. Kolb 1984; Moon 1999; Schön 1983). However, such discussions happen spontaneously and are informal, and only include the ambulance personnel present then and there. Written reports containing experiences from responses are seldom created and distributed amongst the personnel. Nevertheless, there is still some sharing of experience in these dialogic kinds of ways.

Between responses, ambulance personnel often exchange experiences. Ambulance personnel are very preoccupied with their work, and they like to discuss medical issues and treatment of patients. I observed many times that they told each other about patients they had responded to, and special aspects of the situation and/or the treatment. The focus was always on the technical part of the work, not on sensitive personal information about the patients. For example, one paramedic talked about a patient suffering from a stroke whom he had treated a few days earlier, where his partner instructed him to insert an intravenous canula in the patient's

elbow (to ease the hospital staff's work, enabling the patient to get the necessary treatment faster). Some of the personnel listening in did not know that this should be done, but now became aware of the need to take this action (this is, however, not a part of the standard procedure, but an established practice at the specific hospital). Common to this kind of experience-sharing is that it is unsystematic and occurs through informal storytelling and discussions. Nevertheless, the learning effect should not be underestimated. Several studies show that interpersonal sharing of experiences is a highly valuable way of learning (see e.g. Caminotti and Gray 2012; Klein 1998; Sommer and Njå 2011; Swap et al. 2001); it contributes to timely sharing of experiences and makes it possible to learn directly from others' personal knowledge and experiences. Hence, occasional discussions enable learning experiences based on happenings at the workplace that colleagues are involved in (their experiences from these occurrences and the actions they took) and/or dialogues where colleagues' point of view and what they consider to be meaningful become accessible.

32.5.3 Feedback on Responses

Ambulance personnel value feedback on their responses. In ordinary cases, where it is quite clear for the involved personnel what illness or injury the patient was suffering from and which treatment was necessary, they do not feel much need for external feedback. Most of the EMTs and paramedics consider that the post-response discussions of their performance in the ambulance crew (i.e. reflection) provide the necessary assessment of the quality of their response. However, several of the EMTs and paramedics said that in more special cases, where they have some doubt about what was wrong with the patient and/or what actions should ideally be taken, they want external feedback on their response. Hence, they want to know if they had understood the patient's situation correctly (i.e. what was actually wrong with the patient) and if they had given the correct treatment, or if they could have done a better job. In other words, what they want is informative feedback on their performance, which according to researchers on development of expertise is fundamental for learning (see e.g. Ericsson 2004, 2006; Kahneman and Klein 2009).

The problem in the ambulance service is, however, that there is no formal system that automatically provides external feedback on responses. Many paramedics said that they used to contact the staff at the emergency room or the attending physician at the hospital ward to get feedback after responding to special cases. For example, two paramedics talked about cases they had responded to where they suspected the patients might be suffering from meningitis. But, as the symptoms of this illness resemble the symptoms of several other illnesses, they were unsure if they had got it right. They subsequently contacted the doctors at the hospital, and asked if they had interpreted the symptoms correctly and if they had taken the right actions. However, ambulance personnel do not always get feedback on their performance. Sometimes it is difficult for them to get in touch with the right people who

can give them feedback, or the doctors are not willing to provide the necessary information. One paramedic experienced this refusal. He had transported a patient to the hospital. The patient was sick and clearly needed medical attendance by a doctor, but the paramedic did not consider the patient's condition to be life-threatening. Nevertheless, some days later he found out that the patient had died the day after arriving at the hospital. He then started to wonder if there were some significant symptoms he had not noticed or if his treatment had been insufficient. However, he was prevented from getting any feedback, and never found out if he had done something wrong. Losing the opportunity to receive feedback on performance thus hinders the ambulance personnel to learn from their responses, and may even contribute to insecurity and a feeling of doubt in own skills and knowledge. In the health and medical professions, seeking feedback from colleagues and other medical practitioners is common both to get advice on treatment and as a way of learning in general (see e.g. Gagliardi et al. 2007; Phelan et al. 2006; Sargeant et al. 2008; van de Wiel et al. 2011). Therefore, feedback on responses is a prerequisite to enable learning experiences in situations where someone questions their own performance.

32.6 Learning Through Educational Activities

Ambulance personnel regularly participate in educational activities arranged by the ambulance service. The aim is both to maintain and to further develop their skills and knowledge. The data analysis revealed that local station training (i.e. taking place when the personnel are on duty) and mandatory training days (i.e. when working time is dedicated to training) are the two main categories of learning through organised training in the ambulance service. During this training, the ambulance service strongly emphasises the contextual factors' influence on personnel's learning. In addition, ambulance personnel occasionally take external courses and participate in emergency response exercises.

32.6.1 Local Station Training

Every 6 weeks the ambulance personnel participate in a 2-h long training session at their local station, with the purpose of bringing a stronger focus to bear on medical care in everyday work. "By having dedicated time to get together, we can concentrate on medical issues and treatments without too much chit-chat", an instructor stated. The aim of the local station training is mainly to refresh EMTs' and paramedics' knowledge, not to introduce new things. The training sessions I observed began with a short theoretical lecture given by the instructor (sometimes the instructor gets a doctor to join in as co-instructor), but most of the time was spent on discussing different cases. These case-discussions started with the instructor

giving a description of an imagined patient's condition and symptoms, which the EMTs and paramedics then had to "treat" (explain what the patient's problem was and which treatment to give). However, the instructor was not trying to test if the EMTs and paramedics knew the correct answer. Instead, he involved them and made them reflect on their experiences. When the EMTs and paramedics explained how they would solve the cases, he frequently asked them questions like "what would you do here?", "why do you want to do that?", "what happens then?", "what do you do if..." This apparently had a learning effect, especially on the EMTs. Those who did not know how to solve the cases or reported being insecure were helped by the instructor to arrive at a suitable solution. For the EMTs and paramedics who knew the solution, on the other hand, these discussions appeared to be a suitable way of checking their understanding and refreshing their knowledge. In general, the EMTs and paramedics considered these training sessions to be useful. Correspondingly, discussions of cases and scenarios are found to be a valuable training method for learning crisis and emergency management, thus helping individuals develop and improve decision-making abilities (see e.g. Alexander 2000; Crichton 2009; Crichton et al. 2000; Nilsson 2009). Structuring such discussions through regular training sessions contribute to compensate for some of the "randomness" of the learning experiences in practice settings. Arranging an educational setting with instructions and discussions therefore enables learning experiences through guidance and feedback from more knowledgeable persons (i.e. an instructor or a doctor) regardless of the learning experiences experienced (or missed) during work.

32.6.2 Mandatory Training Days

Every EMT and paramedic has to participate in four separate training days a year. These training days are mandatory and a part of their regular working hours. With about 150 persons working in the ambulance service in total, the ambulance service arranges each training day ten times (i.e. four times ten training days a year). These mandatory training days are, therefore, both a costly and a resource-demanding part of running the ambulance service. Nevertheless, this is regarded as well-invested time and money: "The mandatory training days are both useful and important for learning and quality-improvement in our service!" one of the managers in the ambulance service stated. The training days take place at a special training centre for acute medicine. This centre has modern facilities for lectures (i.e. auditoriums) and for skills proficiency training and full-scale simulation-based training in teams. Teaching at the centre relies heavily on evidence-based medicine and the staff holds a high level of both medical and pedagogical competence.

A typical training day at the centre consists of a lecture, followed by skill training and simulation-based training. Each training day has a special topic, such as cardiopulmonary resuscitation (CPR), cerebral stroke, physical traumas, or mental care. The topics are decided by the managers in cooperation with the instructors and the

chief doctor responsible for pre-hospital medical care. They select topics systematically, so the different aspects of the ambulance personnel's work are covered regularly. In addition, they evaluate the EMTs' and paramedics' performance during the training days (e.g. assessing their skill and knowledge level according to required qualifications), seek feedback from the head physicians at the various hospital wards (e.g. assessing the medical care given by the EMTs and paramedics in relation to the hospital's need for the giving of good and efficient treatment), and look out for new things that need to be introduced (e.g. reading medical journals, participating on courses and seminars etc.).

The lecture, given by an instructor with extensive experience from ambulance work or a doctor with specialisation in a particular field, focuses on the topic of the day. In these lectures, existing medical knowledge and ways of treatment are repeated and new knowledge or treatment procedures introduced. The training days I observed focused on continuous positive airway pressure (CPAP), which is a method used to help patients with water in their lungs to breathe. The chief doctor responsible for the pre-hospital medical care given by the ambulance service (i.e. the procedures that the ambulance personnel work by) had recently decided to change the procedures for CPAP. These changes, based on the latest research in the field, allow the ambulance personnel to use CPAP more often and in more situations than before. These changes were introduced to the EMTs and paramedics at this training day (usually changes in procedures or other new matters are introduced at the mandatory training days). During the lecture, the instructor emphasised the changes in the CPAP procedure, how and when to use it, and what the EMTs and paramedics needed to pay extra attention to. However, the lecture was not conducted solely as one-way communication by the instructor. The EMTs and paramedics were encouraged to ask questions, which they also did. They often asked questions to clarify things and about what to do in certain cases with patients. In addition, some of the paramedics talked about incidents where they had used CPAP. These stories resulted in discussions about the treatment the paramedics had given, and then related to the new changes in the procedures.

After the lecture, the EMTs and paramedics engage in hands-on training related to the topic of the day. They are divided into smaller groups (usually three or four in each group) and alternate between different training tasks. These training tasks include skill training (i.e. treatment procedures) and simulation-based training in teams (i.e. complete responses to ill or injured "patients") with the use of manikins and patient simulators. A closer description of the use of patient simulators and simulation-based training in health care can be found in the literature (e.g. Jeffries 2007; Nehring and Lashley 2010; Riley 2008). In the observed training tasks, the EMTs and paramedics were assigned to solve different cases given by the instructors (which were about respiratory treatment and the use of CPAP). First, the instructor described the patient's condition and symptoms. Then, the EMTs and paramedics, as a team (ambulance crew), treated the patient with equipment similar to what they have at their disposal in the ambulance. When they took certain treatment actions, the instructor changed the patient simulator's state. In this way, the EMTs and paramedics received direct feedback on the treatment they gave.

If they took correct actions, the patient's condition changed for the better (showing more favourable symptoms), and if they took inappropriate actions, the patient became worse.

Each training task ended with a thorough debrief, where the instructor led a discussion about what the EMTs and paramedics had done and how they had been thinking. The instructor asked questions that challenged them and made them reflect. The instructor also instructed them and explained aspects of the case and the treatment. This combination of questioning and instruction appeared to help especially the EMTs, but also the paramedics, to get a better understanding. According to the instructors, these debriefs/discussions are a vital part of the learning. One instructor said:

Only giving a lecture and then sending the participants home isn't any good. That method is out of date, and does not result in much learning. But practical training combined with discussions afterwards is a much better way to learn. In this way each EMT and paramedic gets to reflect on what they have done. The discussions ensure the necessary connection between medical knowledge and practice.

The mandatory training days are highly valued by the ambulance personnel. "These training days are some of the most brilliant we have!" a paramedic stated. The general opinion of both EMTs and paramedics was that the training days were both important and useful, because they get the opportunity both to refresh and maintain existing skills and knowledge and to learn new things. Thus, both theoretical and practical knowledge are emphasised, which in combination are needed for individuals to develop their professional capabilities (Lum 2009; Winch 2010). In addition, the learning approach used was emphasised as a good way for them to learn (the combination of hands-on training and debriefs/discussions). An instructor supported this view:

When we started to arrange training days at the centre, the more senior paramedics in particular were quite sceptical. They wanted to continue to learn things "the old way", and didn't have much belief in doing simulation-based training with patient simulators. But now it is actually the seniors who are most positive to simulation and the training centre. This I believe is a very good indicator that the learning methods we use work very well, and that this is useful for the EMTs and paramedics.

Simulation-based training combined with discussions is clearly valuable for ambulance personnel's learning. They get the opportunity to benefit from a learning process characterised by personally doing and experiencing something (cf. Bandura 1977; Skinner 1965) merged with timely feedback (cf. Ericsson 2004, 2006; Kahneman and Klein 2009) and reflection (cf. Kolb 1984; Moon 1999; Schön 1983), all of which are considered essential for learning according to the individual cognitive approach to learning (see e.g. Hager 2011; Ormrod 2008; Piaget 1972/1997). This way of learning is thus proven highly effective in preparing health and medical professionals to treat patients and manage critical medical situations (see e.g. Alinier 2009; Buckley and Gordon 2011; Garrett et al. 2011; McCaughey and Traynor 2010; Roh et al. 2013). In all, the mandatory training days enable learning experiences focussed on new and important topics, where the educational setting ensures regular and systematic updating of skills and knowledge.

32.6.3 Contextual Features

The managers at the ambulance service are keenly aware how contextual features influence ambulance personnel's learning. Particularly in relation to the mandatory training days, the managers try to arrange a setting that promotes effective learning conditions. One manager stated:

We are extremely conscious of the qualities we want our instructors to have. We want to create a feeling of security in the training situation – an environment where the EMTs and paramedics are allowed to not know everything, where they can ask foolish questions, and make mistakes on the training tasks. We also bear in mind that each one has a lot of knowledge, and that the instructor's task is to help the EMTs and paramedics to reach the solution on their own.

Both the mandatory training days and the local station training were observed to be characterised by trust and openness; characteristics emphasised in the socio-cultural approach to learning as essential for learning to take place (see e.g. Dekker et al. 2008; Eraut 2004; Hager 2011; Wenger 1998). The EMTs and paramedics were not afraid to show that they did not know everything, and most of them admitted that they had something to learn. However, this attitude has not come about by itself: "It wasn't like this in the beginning, so we have worked consciously over many years to get where we are today", one of the managers said.

The managers' experience is that the attitude they emphasise in relation to the training helps to build a good culture in the ambulance service as a whole. "The way we train and instruct our people influences how they behave out on responses", one of the managers stated. By this, he meant that they bring along positive attitudes of trust and openness, which helps them to be open about their own insufficiency and to respect their partner's opinion. "During the training we have been working to teach the EMTs and paramedics to complement each other as a team", another manager said. My observations of the ambulance personnel at work confirm the existence of an attitude characterised by openness and team focus. Emphasising the contextual features when carrying out training sessions therefore not only promote learning experiences in educational settings but also have a positive effect on learning experiences in practical settings.

32.6.4 External Courses and Emergency Response Exercises

Emergency response exercises, where personnel from various emergency response organisations (such as the ambulance service, fire department, and police) train together on managing mass casualty events, are shown to have a positive effect on response personnel, thus contributing to learning amongst the participants (see e.g. Perry 2004; Peterson and Perry 1999). Every now and then, the EMTs and paramedics participate in emergency response exercises; mostly minor events with few casualties but sometimes major multi-casualty events. In most of the exercises, however, the

ambulance personnel are just present without actually giving any treatment (i.e. they mainly demonstrate what they *would* have done if it was for real). This demonstration is used because they usually have to be ready to respond to real incidents and patients, and, therefore, cannot occupy the ambulance and its equipment. The reason for this approach is that they seldom dedicate ambulances and ambulance personnel to exercises, which, according to one of the managers, are an issue of costs. A more frequent and active participation in major exercises could, however, be a positive contribution to the ambulance personnel's learning, especially in relation to mass-casualty events.

The ambulance personnel also take external courses on health and medical related topics from time to time. Which courses they can take depends on the courses available and the station's spare capacity to send personnel on courses. Hence, the ambulance personnel themselves usually have to take initiative if they want to participate on external courses. Nevertheless, studies of personnel in emergency medical services have demonstrated that courses and similar activities, consisting of combinations of lectures and drills that enable both educational and practical experiences, contribute to improve the personnel's performance (see e.g. Chaput et al. 2007; French et al. 2006; Oser et al. 2010). Letting ambulance personnel take external courses may, therefore, be beneficial for their learning and development of competence. In other words, having access to educational settings outside the workplace (i.e. emergency response exercises and external courses) enable learning experiences that are not possible to experience within the workplace (either at the educational or practical settings that the ambulance personnel normally have access to).

32.7 Discussion

In the following sections, the main findings in this study are described and discussed. These are the need of the two approaches to learning (i.e. the individual cognitive approach and the socio-cultural approach) to be used together to explain individuals' learning in and for work performance and that *both* learning through practice and learning through educational activities are of importance for individuals' professional learning. In addition, some practical implications of the findings are proposed.

32.7.1 A Combined Approach to Learning

This study shows that a combined approach to learning (learning as acquisition and learning as participation), operationalised through the three elements *content*, *context*, and *commitment*, is useful to explain learning related to professional practice and work.

The socio-cultural approach to learning focuses on the *context* surrounding individuals at their workplace, thus considering participation and interaction with more knowledgeable persons within the natural work environment as an essential prerequisite for individuals to learn (Lave and Wenger 1991; Wenger 1998). This study supports the need to consider contextual features when explaining workplace learning. Interaction between ambulance personnel, both through guidance and occasional discussions, constitutes a considerable part of ambulance personnel's learning. Apprentices learn mainly by working together with paramedics, where they observe the paramedics in action and then do things themselves under guidance. Apprentices, thus, appropriate the existing culture and acquire the situated knowledge (cf. Billett 2010; Lave and Wenger 1991; Wenger 1998). In addition, storytelling and discussions contribute strongly to providing ambulance personnel with information to learn from. This kind of verbal communication helps apprentices gain access to the knowledge residing in the ambulance service, and to exchange experiences, meanings, and views amongst the EMTs and paramedics in general. The value of storytelling in relation to learning and, thus, a context that promote interpersonal sharing of stories and experiences, is also emphasised elsewhere (e.g. Caminotti and Gray 2012; Klein 1998; Sommer and Njå 2011; Swap et al. 2001; Wenger 1998).

The individual cognitive approach to learning focuses on individuals' *commitment* (i.e. involvement in learning activities), thus emphasising the need of mental or physical activity for learning to occur. This study also supports the need to consider acquisition of skills and knowledge when explaining workplace learning. For ambulance personnel to actually learn something, the things to be learnt have to be integrated in the individuals. In this study, the need for practical experience, hands-on training and discussions, both in relation to responses and organised training, was evident. Thus, for EMTs and paramedics to learn to make adequate decisions in emergency situations and to carry out actions efficiently, it is crucial that they are involved in the learning process. Both embodiment of skills and knowledge (Lloyd and Somerville 2006; Sommer and Njå 2011) and reflection (Kolb 1984; Moon 1999; Schön 1983) are acknowledged as important to the learning process. This process is essentially about acquisition of (new) information and behaviour and building of more adequate cognitive structures (Baddeley 1999; Bandura 1977; Ormrod 2008; Piaget 1972/1997), which is the essence of the individual cognitive approach to learning (Beckett and Hager 2002; Hager 2011).

Both approaches to learning, of course, take into consideration the *content* of what is being learnt. For individuals to learn at the workplace there must be *something* for them to learn. This study shows that the content of ambulance personnel's learning included both medical (factual) knowledge and practical (procedural) knowledge. To be vocationally and professionally capable requires certain understanding of how a particular world works, which makes theoretical (i.e. factual) knowledge and the opportunity to *think* about that world necessary (Lum 2009). Practical experience (procedural knowledge) alone is, therefore, not sufficient to become, and remain, a skilled EMT/paramedic. Medical knowledge, preferably

science based, is equally important (Chamberlain and Hazinski 2003; The Laerdal Foundation for Acute Medicine 2011), and thus essential for EMTs and paramedics if they are to make adequate assessments and judgements in pre-hospital situations. Nevertheless, the EMTs and paramedics do not acquire the content of their learning in isolation; the learning takes place at work in the ambulance service. Situated knowledge at the workplace constitutes a major part of what individuals learn (Billett 2010; Lave and Wenger 1991; Wenger 1998). Through the use of artefacts, individuals develop competence that is anchored largely in professional culture and practice (Filstad and Blåka 2007; Säljö 2002; Wenger 1998).

Accordingly, using the elements *content*, *context*, and *commitment* when explaining, and analysing, learning in the workplace enables us to take into consideration *what* individuals learn in terms of information, behaviour and situated knowledge, the *conditions* surrounding them that makes it possible to learn, and *how* they learn through personal involvement. This combined approach to learning, in turn, helps highlighting the contribution of both learning through practice and learning through educational activities.

32.7.2 Learning Through Practice and Learning Through Educational Activities

Both learning through practice and learning through educational activities are crucial for ambulance personnel's professional learning. Guidance, occasional discussions, feedback on responses, local station training, and mandatory training days are all vital in ambulance personnel's learning. These forms of learning fulfil different learning needs, thus complementing each other. Consequently, as evident in this study, learning at the workplace is a complex process where both learning experiences in practice situations and educational settings are of importance.

Ambulance personnel's learning through practice has an incidental and informal character, but is at the same time largely goal-directed. Informal learning at workplaces can, according to Eraut (2004), be characterised as implicit, unintended, opportunistic and unstructured learning, with the absence of a teacher. For these reasons, learning at workplaces is commonly considered to be a by-product of work processes. However, Billett (2002) argues that, because workplace learning experiences are intentional and shaped by structural factors associated with work practices, it is incorrect to refer to workplaces as informal learning environments. He states that all learning, whether it is in an educational institute or a workplace, is participatory, structured, and goal-directed. Participation in work activities is therefore intentionally organised to structure workers' access to the knowledge needed to sustain the work practice (Billett 2004). The findings in this study partly support Billett's view. During the period of apprenticeship, apprentices follow a structured pathway towards authorisation as an EMT. Their learning through interaction with paramedics is indeed goal-directed, aiming at furnishing the apprentices with the skills and knowledge needed to provide pre-hospital care to an adequate and safe

standard. The learning is thus intentional and can be described by a workplace curriculum (cf. Billett 2006). Furthermore, ambulance personnel's learning during their everyday work, i.e. the learning that emerges from occasional discussions and feedback on responses, can also be characterised as goal-directed, because the EMTs and paramedics actively engage in discussions, storytelling and search of feedback. However, the ambulance service, as an organisation, has neither arranged for nor structured the occasional discussions and feedback on responses. After all, whether an EMT or paramedic get to be part of a discussion, listen in on a story, or receive feedback on his or her response, depends partly on their own initiative and partly on them being at the right place at the right time. These learning activities, therefore, become unplanned and ad hoc, especially from an organisational point of view, and can therefore, to some extent, be characterised as occasional and a side effect of the work activities.

Educational activities allow ambulance personnel to get regular training and systematic updating of their skills and knowledge. Both the local station training and the mandatory training days aim at maintaining and further developing ambulance personnel's skills and knowledge. These educational activities, especially the mandatory training days, ensure that all of the ambulance personnel in the ambulance service receive the same level of training, in addition to new knowledge that emerges within their field of work. Hence, the ambulance service's experience is that new knowledge is most successfully introduced on the mandatory training days. Here *everyone* gets access to the new knowledge. All of the EMTs and paramedics in the ambulance service attend the same lecture on the topic of the training day, thus making sure that everyone is updated on the medical knowledge. The same goes for the practical part, where everyone is instructed based on the same standard. For the educational activities to contribute to ambulance personnel's professional learning, the learning methods used is of crucial importance. At the mandatory training days, a combination of lectures, hands-on training, and debriefs/discussions are used, all of which happens in a contextual setting characterised by trust and openness. This enables both embodiment of skills and knowledge (cf. Lloyd and Somerville 2006; Sommer and Njå 2011) and reflection (cf. Kolb 1984; Moon 1999; Schön 1983), in addition to a context with the necessary prerequisites for learning (cf. Dekker et al. 2008; Eraut 2004). Judging by the utility value expressed by the EMTs, paramedics and managers, these mandatory training days, and the learning method used, are obviously a key element in ambulance personnel's continuous learning throughout their working lives.

This study demonstrates the need to focus on both learning through practice and learning through educational activities to understand and analyse individuals' professional learning. Further research on professional learning will, therefore, benefit from focusing on learning experiences in both practice situations and educational settings. Hence, a stronger connection between the two kinds of experiences can potentially improve learning in the workplace, thus improving individuals' continuous learning throughout their working life.

32.7.3 *Practical Implications*

The learning taking place in the ambulance service studied can, from a medical point of view, be considered good. Medical studies carried out in the same ambulance service show high survival rates after out-of-hospital cardiac arrests in the service's region, a survival rate that has increased in the last decade (Lindner et al. 2011). In addition, the paramedics in this service have proven to be capable of delivering high-quality cardiopulmonary resuscitation (CPR) even if situations become challenging and stressful (Bjørshol et al. 2011). Regular simulation/CPR refresher training may be an important factor in enabling healthcare providers to deliver this high-quality CRP (Smyth and Perkins 2011). Accordingly, the high level of medical care given by the EMTs and paramedics supports good learning in the ambulance service as a whole. However, this study reveals a few areas in relation to learning where there is room for improvement: exchange of experiences, feedback on responses, and connection between practice and educational activities.

The lack of systematic sharing of experiences from responses is a barrier to ambulance personnel's learning. Ambulance personnel learn a lot both from stories about other EMTs' and paramedics' experiences and discussions with colleagues. Stories thus become a form of vicarious experience for individuals who have not experienced these things themselves (Klein 1998; Okray and Lubnau 2004) and discussions a form of reflection (Kolb 1984; Moon 1999; Schön 1983). However, the problem is that exchange of experiences largely takes the form of informal storytelling and ad hoc discussions. To get access to and learn from these stories and discussions, an EMT or paramedic simply has to be at the right place at the right time. Consequently, experience-sharing tends to be unsystematic. To improve learning from responses, it is therefore necessary for the ambulance service to transfer experiences from responses to the entire organisation. Thus, it is essential that experiences and findings from evaluations are assimilated by the organisational members as well as codified in suitable artefacts of the organisation (Borell and Eriksson 2008). This integration can be achieved, for instance, by first documenting experiences from responses and results of discussions and then passing on these documents to all of the ambulance personnel or making them available for the instructors to use in training sessions, thus following a process of knowledge accumulation and collective reflection (Sommer and Njå 2012).

A system that ensures feedback to ambulance personnel on their responses could improve their learning. The ambulance personnel in this study clearly stated that they value feedback on their responses. Nevertheless, feedback is given at random. The kind of feedback that EMTs and paramedics want is whether they understood a patient's situation correctly and gave the correct treatment, or if they should have done something different. In other words, the ambulance personnel want to know if they should do the same in similar situations in the future or if they need to change their behaviour. Change, in one way or another, is the traditional way of looking at learning (e.g. Argyris and Schön 1996; Illeris 2007; Ormrod 2008). If the EMTs and paramedics realise a need to change, and then actually do change, they have

undoubtedly learned. Similarly, if the EMTs and paramedics have it confirmed that they acted correctly during a response, they have also learned. Confirmation of ambulance personnel's existing knowledge and practice will be a kind of positive reinforcement, which is known to be an important aspect of learning (Ormrod 2008; Skinner 1965). Therefore, to enable ambulance personnel to learn from their responses, there needs to be a system that ensures feedback by giving EMTs and paramedics confirmation on their behaviour or information about necessary changes.

Connecting ambulance personnel's learning experiences from practice with the educational activities arranged by the ambulance service could improve learning in the ambulance service as a whole. The topics of the training days are decided by the managers in cooperation with the instructors and the chief doctor responsible for pre-hospital medical care. Even if they seek some feedback on the ambulance personnel's performance, the training days are mostly arranged without any influence of the ambulance personnel. However, the educational activities could be more goal-directed, and thus better contributing to learning in the ambulance service, if the ambulance personnel's learning needs were more emphasised. Ebell et al. (2011), for instance, has found that questions asked by health care professionals at the point of care are useful as basis for a needs assessment for continuing education; it can be used by educators to develop training activities that directly address the information needs and questions of learners. Hence, if the questions ambulance personnel ask themselves or each other during responses, thus manifested through the occasional discussions and search for feedback on responses, were collected and used as basis for the topics of (some of) the training days, the ambulance personnel's learning needs in relation to practice could be better addressed. Consequently, a stronger connection between learning through practice and learning through educational activities can potentially improve learning and practice in the workplace when trying to secure ongoing professional learning in this health-care occupation.

32.8 Conclusions

The findings in this study demonstrate that both learning through practice and learning through educational activities are crucial for professional learning. Learning through practice has an incidental and informal character, taking the form of guidance, occasional discussions and feedback on responses based on happenings during work, while learning through educational activities are formalised learning activities where individuals get regular training and systematic updating of their skills and knowledge. As a result, educational experiences and experiences arising through practice fulfil different learning needs, and are complementary.

In addition, this study supports the need to use a combined approach to learning (i.e. combining the individual cognitive approach and contributions from the social world) when explaining and analysing learning related to professional practice and work. A combined approach gives a more precise account of *what* individuals

learn in terms of information, behaviour and situated knowledge, the *conditions* surrounding them that make it possible to learn, and *how* they learn through personal involvement, especially in emergency response work, than either of the two approaches gives alone.

The quality of the medical care given by the EMTs and paramedics in the ambulance service studied is high, which confirms good learning in the ambulance service as a whole. However, this study reveals a few areas in relation to learning where there is room for improvement. First, there should be more systematic sharing of experiences. Exchange of experiences largely takes the form of storytelling and ad hoc discussions, but should instead be transferred systematically to the entire organisation. Second, feedback on responses should be given automatically. Without the opportunity to receive confirmation on the behaviour during responses or information about necessary changes, individuals lose the opportunity to learn from responses where they question their own performance. Third, the learning experiences from practice should be used as basis for a learning needs assessment for the educational activities. Questions asked and issues discussed during work are closely related to individuals' learning needs at the workplace; learning needs that educational activities with advantage can be used to address. A closer connection between learning experiences in practice and educational settings, therefore, has the potential to improve the process of continuous learning throughout individuals' working lives.

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Chapter 33

Mimetic Learning at Work: Learning Through and Across Professional Working Lives

Stephen Billett

Abstract This chapter offers an explanatory account of how much, if not most, of professionals' learning across their working lives proceeds: through processes of mimesis. Or, through mimetic learning at work as it is referred to here. To be precise, this learning arises through processes of observation, imitation and practice that comprise everyday work activities. In this way, an account of professionals' mimetic learning through their work is important as likely the majority of the learning required to sustain and develop further their occupational capacities occurs through these means. That is, predominately, it is generated outside of circumstances of direct guidance of other and more experienced peers (e.g. being taught or guided), with others (e.g. teachers or experienced co-workers etc.) and in circumstances where others' intentions for that what is to be learnt are enacted (i.e. through education programs). So, beyond the many accounts and explanations focusing on direct interpersonal interactions with others, there is a need to understand this more personally-mediated process of professionals' learning and development. Hence, rather than professionals' learning through work being largely explained by the actions of others, here, and emphasising direct engagement with others (e.g. inter-psychologically), it is timely to consider further how professionals' learning in the circumstances of work is also mediated by personal epistemologies yet also accounted for intra-psychologically (i.e. within the person). Consequently, to augment these existing accounts, it is necessary to offer one that emphasises this more personally-mediated process by drawing upon recent considerations of individuals' dispositions, epistemological beliefs and epistemologies, and developments within anthropology, developmental and some fresh bases arising from cognitive science are utilised to offer an account of mimetic learning and to appraise

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its potential contributions more comprehensively. It follows, therefore, this chapter elaborates how professionals' worklife-long learning comprises an active and personally-directed mimetic process that is central to their learning through, not in everyday work situations, but also those in other circumstances as well. More generally, mimetic learning at work offers an account of how learning and development arises across professionals' lives. In concluding it is proposed by setting out some premises that might comprise the foundations for an account of adults' learning through mimetic stud in the circumstances of work.

Keywords Learning across lives • Professional learning • Mimesis • Mimetic learning and development

33.1 Mimetic Learning Across Working Life

This chapter offers an explanatory account of how much, if not most, of professionals' learning across their working lives is held to proceed. That is, through processes of mimesis or as it is referred to here, through mimetic learning at work. This comprises learning arising through processes of observation, imitation and practice that are enacted last engaging in everyday work activities and interactions. An account of professionals' mimetic learning through their work is, therefore, held to be important as, likely, the majority of the learning required to sustain and develop further their occupational capacities occurs through these means across their working lives. Predominately, this learning is generated outside of circumstances of direct guidance of other and more experienced peers (e.g. being taught or guided), in the absence of such others (e.g. teachers or experienced co-workers etc.) and away from circumstances where others' intentions for that what is to be learnt shape that learning experiences (i.e. through education programs). So, beyond the many accounts and explanations focusing on learning arising through direct interpersonal interactions with others, there is a need to understand this more personally-mediated process of professionals' learning and development. Hence, rather than professionals' learning through work being largely explained by the actions of others and emphasising direct engagement with others (e.g. inter-psychologically), it is timely to consider further how professionals' learning in the circumstances of work is also mediated by personal epistemologies yet also accounted for intra-psychologically (i.e. within the person).

Consequently, to augment existing accounts, it is necessary to offer one that emphasises the more personally-mediated process of learning by drawing upon recent considerations of individuals' dispositions, epistemological beliefs and epistemologies, developments within anthropology, and some fresh bases proposed by developmental and cognitive science. Together, these contributions are utilised to offer an account of mimetic learning and to appraise its potential contributions more comprehensively. Therefore, this chapter elaborates how professionals' worklife-long learning comprises an active and personally-directed mimetic process that is central to their learning and development through everyday work activities and interactions. Beyond these considerations, as a fundamental process of human learning and

development, what is suggested here likely has applications in other circumstances (e.g. participation in educational programs), although these are not discussed here.

This chapter, in advancing its case progresses, firstly, discusses the need for an account of mimetic learning and how this might comprise. It claims that much, if not the majority, of learning occurs across professionals' working lives arises outside of direct interpersonal interactions with more informed partners. Next, the chapter draws upon historical, anthropological and recent accounts from behavioural and cognitive science to elaborate more fully, the nature and effectiveness of the mimetic bases of learning, including intra-psychological mediation. In conclusion, and in setting out what might comprise foundations for a theory of mimesis at work, three sets of premises are advanced through accounts of: (i) processes, (ii) outcomes and (iii) procedural implications for promoting learning in and through the circumstances of work.

33.2 Need for an Account of Mimesis

An explanation and elaboration of mimetic learning seems timely, necessary and pertinent. It offers an account of how learning and development arises across professionals' working lives, and in ways that reflect long standing processes that have served humans and human societies well and which pre-date the advent of 'schools' and schooled societies. By setting out some premises of what might comprise the foundations for an account of adults' learning through mimetic learning in the circumstances of work a means for opening up our understandings of learning through practice is offered. Certainly, the concern here is to offer a comprehensive account and one which accommodates the range of personal, social and brute contributions to that learning. For instance, when interviewing workers from across a range of occupations about how they learn through and for their work, over the past two decades, they consistently described it being premised upon: (i) engagement in work activities, (ii) observing and listening and (iii) 'just being in the workplace' (Billett 1994, 2001). The premises they consistently articulate are quite distinct from those usually associated with intentional learning interludes in educational institutions that are ordered and enacted by others. Instead, most markedly, the quality of learning experiences are characterised as being initiated and realised by learners, themselves, rather than through teaching or direct guidance by others.

Yet, because such process are seemingly now seen as hybrid and lacking legitimacy in schooled societies (e.g. been described as in formal, non-formal etc.), we need to know more about these learning processes so they can be supported and utilised effectively and in ways that can address contemporary work requirements. The first of the three premises mentioned above (i.e. engaging in work activities) can likely be explained through existing socio-cultural accounts of engagement in goal-directed activities (Cole 1985; Rogoff 1990; Scribner 1984) and cognitive accounts informing about learning arising as a legacy of those engagements (Anderson 1982; Sun et al. 2001). This explanation addresses the development of procedural capacities, as well as those emphasising conceptual and dispositional attributes (Gott 1989).

The explanatory bases for why these workers consistently refer to the contributions of ‘observing and listening’ and, in particular, ‘just being there’ are, however, less easy to identify. Certainly, workers often refer to observation and listening as being associated with discerning and constructing goals for their work tasks (i.e. what has to be done, achieved etc.), overall and identifying and coming to know about specific procedural responses to achieve those goals (i.e. how it might have to be done) and how those tasks are to be completed (i.e. appropriate outcomes). If these contributions are as potent as these worker-informants consistently report, learning realised through processes of observing and listening is quite central to understanding and enacting (i.e. learning) work-related activities. Moreover, this process of learning also appears to be salient for developing procedural capacity (i.e. the ability to do things). That is, through securing increasingly mature approximations of observed goals – the key premise for developing skilled capacities (Gott 1989). Consequently it is important that the means by which this learning and development arises need to be understood more fully. It would seem from these accounts that these engagements and outcomes necessarily position ‘observing and listening’ as being active inter-psychological process through which learning arises. It includes active processes of understanding what is required to be undertaken and then, iteratively, attempting tasks and monitoring performance and making changes to secure the observed performance in achieving those tasks. Yet, the locus for these and their enactment, including persistence within them resides with the individual. No amount of external control can mediate these experiences, as Foucault (1986) reminds. Moreover, as long proposed in anthropological accounts (Lave et al. 1984; Marchand 2008; Pelissier 1991), informants’ references to ‘just being there’ are often associated with contributions made by the social and physical environment where these activities occur through their thinking and acting in those circumstances. Also from this discipline, Lave et al. (1984) and ecological psychology (Barker 1968) these contributions are referred to as providing cues and clues about how to proceed. In Vygotskian-inspired social constructivism, these contributions are referred to as mediating artefacts (Wertsch 1993) that inform and possibly shape cognition and action. All of this suggests that adults’ engage in active meaning-making processes when participating in work activities and interactions, and, as such the process and outcomes of engagement with the physical and social environment in which they engage warrant a more comprehensive explanation and elaboration. Certainly, for practical purposes of understanding and possibly improving learning through work across working lives, there is a need for a more informed and comprehensive account about how processes such as observation and imitation (i.e. mimesis) shape this learning through and for professional practice. These concerns extend to how particular experiences might promote professionals’ learning outside of those characterised by close guidance and interactions with others. This consideration includes understanding how learners might be prepared for, engaged in, and monitored and guided when learning without close interactions with more experienced partners. Not the least of these imperatives is that within ‘schooled societies’ there may well be an unhelpful orthodoxy and privileging of direct guidance by others (as in teaching) that diminish the legitimacy and standing of individuals’ learning outside of being taught, guided and supervised through being labelled ‘informal’ learning (Marsick and Watkins 1990).

In addition, prompting this need for a more informed and comprehensive account of mimetic learning at work for the professions are three conceptual concerns. There is, firstly, the imperative to elaborate further the processes through which contributions from physical and social environments shape individuals' cognition. This elaboration includes accounting for individuals' active learning and, particularly, how these contributions are mediated by individuals themselves, thereby extending conceptions of inter-psychological processes beyond those of working directly with interlocutors. Secondly, developments within anthropology and advances from behavioural, developmental and cognitive science are now furnishing new concepts and evidence that informs the processes of human learning and development. Hence, a consideration of mimetic learning at work seems timely and can be used to inform what occurs in practice settings by drawing upon these new concepts and insights. Thirdly, considerations of the learning of socially-derived knowledge (i.e. that required by practising professions) are usually associated with arising through close personal interactions with more informed partners. Hence, the processes of professionals' learning occurring outside of such circumstances needs to be more fully understood and beyond the orthodoxies of guidance by more expert partners or informants. If and where appropriate, these processes may need to be brought more centre stage when considering how learning for and through work progresses. So there are both procedural and conceptual goals to be secured through a more comprehensive account of mimetic learning at work. However, it is important that we have adequate explanations of these processes.

33.3 Everyday Learning in and for Professional Practice

Currently, when consideration is given to learning associated with securing worthwhile personal or social goals, there is a tendency to look towards how this learning is promoted both inter-personally and with pre-determined intentions. That is, how more informed social partners (e.g. teachers, experts, more experienced partners or coworkers) can act to assist, support and guide individuals' intentional learning as directed towards some stated outcomes (e.g. requirements for certification). Such considerations are particularly emphasised and exercised in the current era and in 'schooled societies' where educational provisions are ubiquitous and legitimised and teaching is privileged as the key means of transmitting socially-significant knowledge, such as those required for professional practice. References to such education provisions, of course, extend beyond compulsory education (i.e. primary and high schools) to what occurs in colleges, universities, training rooms and corporate development programs and other circumstances where intentional learning is sought through educational processes and instruction of some kind. The inter-personal emphasis in education provisions is variously through both unidirectional transmissions (e.g. presentation) and bi-directional interactions with others (Valsiner and van der Veer 2000). In such times, even efforts to promote individuals 'self-directed learning are often through engagement with others whose role

is primarily about promoting and guiding others' learning, variously titled as facilitators, coaches, mentors etc. Interestingly, the exceptions here, such as engagement in more solitary critical reflection or reflexivity, tend to emphasise higher-order learning outcomes enacted intra-personally (i.e. within individual) through introspection, albeit often framed by particular educational intents.

However, the worth of inter-personal activities and interactions is not being questioned here. Certainly, much of what needs to be learnt arises from the social world, and learning for professions, with their historical and cultural geneses is no exception. In addition, close guidance by more informed others can be very helpful to learn this knowledge that has arisen historically, culturally and situationally, and needs to be accessed, comprehended and learnt. Indeed, overtly independent epistemological adventures (i.e. wholly discovery based) are unnecessary, and can be unhelpful, inappropriate or even perilous for both learners and their associates. Certainly, accessing social sources of professional knowledge through more expert partners is helpful and, at times, essential, as it would otherwise not be learnt. For instance, the apprenticeship approach to learning occupational practice is usually held to be based on such premises (Billett 2010; Rogoff 1990). So, much of individuals' learning arises from circumstances where others tell, teach, instruct, demonstrate, or otherwise guide individuals' learning inter-personally of socially sourced knowledge, and this is accepted as being quite orthodox (i.e. widely accepted).

However, human learning and development is not constrained by or restricted to direct engagement with more informed interlocutors. This learning is ongoing across our lives as we continuously engage in everyday conscious thinking and acting, and cognitive processes (i.e. micro-genesis) occur both within and outside of circumstances of direct guidance. Much, and likely the majority of learning (i.e. micro-genesis – moment by moment learning) and development across individuals' working lives (i.e. ontogeny) arises in circumstances not directly and immediately shaped by intentions of and interactions with coworkers and/or experts. As learning is ongoing as we thinking and act our everyday experiences as those through which we learn and our development arises. Given this ongoing learning is only likely to be directly guided by exception, unless we are collaborating in some way, the majority of it comprises personally-mediated processes. This does not mean it is asocial not inter-psychological. Quite the opposite: the activities and interactions individuals engage in are social generated and suggested. However, individuals will mediate their contributions in personally-particular ways on the basis of what they have learnt previously or pre-mediate (Valsiner 2000) across their ontogenies or life histories. That is, they actively make sense of what they experience in the media circumstances based upon what they have experienced and learnt before. This premise has long been accepted in developmental accounts (Baldwin 1894) noted how children's observational learning led them to identify and understand inconsistencies and ambiguities in what the social world suggested to them. Children in the second month of their lives are held to demonstrate versatility in imitation: understanding and responding to what they observe or otherwise engage through the senses (Inhelder and Piaget 1924). Also, learning the capacities

required to be effective in schooling arise in children before the age of five in the absence direct teaching and even parental engagement – it arises through active processes of mimesis: observation and imitation (Kosslyn 1980).

Indeed, in these ways, Baldwin (1894), Inhelder and Piaget (1924) and Vygotsky (Scribner 1985) propose that as we think and act, we continually learn micro-genetically (i.e. moment-by-moment) in response to what we experience. These include what individuals elect or are pressed to engage with, and how we direct our cognitive and sensory efforts and resources. Importantly, as foreshadowed, our responses to what we experience are both shaped by and contribute to ways of knowing and knowledge that arise from our socially-shaped personal histories (i.e. ontogenies), in person-particular ways. Rather than learning being reserved for and privileged within educational institutions and through interpersonal engagements, it occurs continuously as we construe what we experience and construct knowledge micro-genetically. This process has been described variously as securing equilibrium (Piaget 1971), ontological security (Giddens 1991) or maintaining viability (Van Lehn 1989). Indeed, across human history, the process of learning culturally and socially-derived knowledge appears to have arisen far more frequently through individuals' engagement in everyday practices, than being explicitly taught by others. Outside of the 'schooled societies' of contemporary times, there is little evidence that close interpersonal activities as in teaching, teaching or direct supervision were used to assist the learning. These engagements were seemingly reserved for the kinds of learning that cannot be readily secured through individuals' action and discovery alone (e.g. Bunn 1999; Singleton 1989). That is, where discovery learning and epistemological action may not be sufficient. Certainly, historical and anthropological accounts consistently suggest that much of the locus for this learning resides within those positioned as learners and this is how learning occupational practices has largely occurred across human history (e.g. Menon and Varma 2010). Jordan (1989) in referring to mimesis states that across humans' evolutionary history "the overwhelming bulk of behaviours, from feeding to grooming, is and has been learnt in this way, rather than being genetically based" (p. 931).

Yet, despite its centrality, this form of personally-directed and mediated construing and constructing knowledge from what is experienced receives limited attention within the literature, and in particular the learning of professional capacities. So, building from the above, personal mediation is probably the most common of learning processes and its reach likely extends to all of the circumstances and activities (including schooling and school activities), because direct guidance occurs only relatively infrequently whilst individuals are constantly engaged in conscious thinking and acting. Indeed, despite being a fundamental and salient learning process, mimesis (i.e. observation and imitation) rarely features in such accounts. Indeed, within schooled societies the central process of mimesis is sometimes seen as being associated with mimicry (Byrne and Russon 1998; Tomasello 1998). Yet, the more it is considered, the greater the absence of accounts about mimesis becomes noteworthy. How this everyday process of learning is captured in accounts about learning for and through professional practice goes beyond a rhetorical question. Understanding this process of learning is also central to accounting for how these

practices are learnt, remade and transformed. That is, this process is not just about individuals learning and development but also how through these processes social and cultural practices are remade and, sometimes, transformed. These considerations also say much about how, predominantly, processes of adult learning and development have become considered primarily as something mediated by others. Yet, cognitive processes bringing about change (i.e. learning and or development) within individuals (i.e. intra-psychologically) are now widely accepted as orthodox within constructivist paradigms as being ongoing and active as individuals make sense of what they experience, consider and enact responses and then appraise the consequences. So, the key distinctions in explanatory accounts discussed here are between how the mediation of the immediate social world (i.e. social constructivism) and individuals' socially shaped ontogenies (i.e. individual constructivism) shape that learning. There are also ongoing deliberations about the degree to which this constructive process is a product of the organism's (e.g. individual's) generation of knowledge from what is experienced (i.e. empiricists' view) and the extent to which organisms have such capacities as a biological legacy of evolution (i.e. the nativist view). Yet, doubtless few, if any, nativist accounts would claim that specific forms of knowledge, such as those required for professional practice, arise as a biological legacy.

Indeed, beyond the consideration of mimesis, the omission of accounting comprehensively for intra-personal processes (i.e. those within the person) more widely is made even more curious given the extensive body of literature by behavioural scientists whose theorisations and conclusions about mimesis extend to humans (Byrne 2003; Byrne and Russon 1998; Tomasello 1998). These accounts offer concepts that are helpful for understanding and explaining and, perhaps even promoting mimetic learning in adult humans when engaging in learning about and through work, and are well aligned to existing and emerging contributions to understanding human cognition. Typically, within mainstream psychological thought these procedures are well accepted and referred to as perception, action and introspection (e.g. Barsalou 2008). Yet, whilst being person dependent it is socio-genetic (i.e. arising through the social world). As proposed above, this person-particular socially-derived ontogenetic development (i.e. individuals learning of professional practice across the lifespan) arises through their ongoing experiences and processes of experiencing the legacies arising from them (Billett 2009). Yet, this proposition about person-dependence does not imply some form of 'anything-goes' individual constructivism or highly idiosyncratic epistemological adventures, although that might potentially occur. So, whilst being person-dependent, individuals' cognition is also shaped by the sets of social norms, forms and practices in which they are immersed or saturated, as Gergen (2000) claims. For example, Harris (2007) suggests the mediaeval notion of Hell owed much to people's daily encounters with fire and burns. Social and brute facts such as these mediate individuals' conceptions and, consequently, their learning. In this way, individuals' cognition is not a process of socialisation: merely replicating what is suggested by the social world, such as through working life. Indeed, this kind of suggestion is not readily or unambiguously projected (Berger and Luckman 1967). For instance, the graphichness of this

conception of hell might be most prevalent to those familiar with fire and flames, and its reception dependent upon acceptance of its conception. Hence, even for the most cosseted of children, tightly supervised workers and didactically taught students, learning is far from being wholly mediated by others.

So, the point being made here is that much and perhaps the majority, of human learning likely occurs through personally-mediated means way and including through not wholly explicit means (Jordan 2011) and those requiring directed conscious thought (Lakoff and Johnson 1999). What is rendered seemingly unconscious becomes part of tacit knowing, and, possibly, ultimately intuitive acts. Those capacities assisting effective performance at work without being engaged consciously are also contributing to ongoing learning in similar ways. Yet, these capacities himself have arisen through engagements with the social world. Hence, much of what is experienced when walking, driving, talking et cetera is premised upon and also shaped by these kinds of capacities. They are not enacted ‘mindlessly’ will, but make minimal demands upon conscious thought, so that individuals may not be conscious of them. Much intentional and socially-mediated everyday learning through professional practice occurs in this way and outside of direct inter-personal interactions with close social partners. Yet, as such processes are inter-psychological processes even when enacted outside of close interpersonal interactions. So, it is now timely to consider how mimesis supports learning in and for the professions.

33.4 Mimesis and Learning for the Professions

Mimesis – the imitative representations of nature or human performance –, arising through observation, imitation and practice is an elemental and central process of cognition underpinning learning (Jordan 2011; Marchand 2008; Reber 1989). Mimesis is not only exercised extensively and continuously by humans, but is also the most common and enduring form of learning from others across other species (Byrne 2003). Indeed, as with some animals, despite being personally mediated, it comprises a form of social engagement and learning. That is, it is socio-genetic – it comprises social bases for cognition and human development. Because of the absence of direct interaction with teachers and other informed partners, however, this process of learning is not privileged within schooling or education discourses. Indeed, there is a tendency in schooled societies for such a process to be dismissed as being inferior (e.g. informal, ad hoc etc.) because it is not directly guided by more informed (teacher or instructor) partners (Marsick and Watkins 1990). Within such a discourse, the term imitation is often associated with low-order processes of mimicking (Byrne and Russon 1998) – the ‘mindless’ copying of activities without knowing how or why – instead of a complex cognitive process requiring and being realised through higher-order procedures. Mimesis requires understanding the context for action to be taken, and individuals placing themselves in the position of observed actors, and generating and reproducing modelled behaviours, actions and practices with their own bodies (Reber 1992). In this way, mimesis not only

requires, but promotes higher-order capacities, and as (Jordan 1989) suggests that to appreciate the pervasiveness and salience for humans of this mode of skill and knowledge acquisition. She holds acquiring language and daily living skills as being premised upon and exercised through mimesis, as are learning to drive a car, give a lecture, behave at social events are all learnt through bodily imitation (Jordan 1989). Bunn (1999) and Marchand (2008), also hold a range of different kinds of capacities are acquired in this way, and in the absence of direct interpersonal guidance, and that most learning, of course, happens “in the way that most humans learn their first language – on-the-job – in the process of living life itself, as an apprenticeship in living” (Bunn 1999, p. 74).

In these ways, anthropologists such as Lave (1988, 1990, 1993), Pelissier (1991), Bunn (1999) and Marchand (2008) emphasise the centrality of observation, imitation and opportunities for repeated practise and the bases not only for individuals’ learning, but also the remaking of culturally-derived practices, such as occupations. Importantly, and as foreshadowed, these dual processes of learning and remaking cultural practices are largely directed by the learners personal epistemologies. As noted across anthropological accounts there are few references to direct interpersonal guidance by more experienced partners (Bunn 1999; Gowlland 2012), thereby positioning mimesis as a processes of learning. That is a personal fact. Indeed, Bunn (1999) when describing the learning of capacities required for nomadic life in Kyrgyzstan refers to these as lived experiences. Yet, he identifies one element as being particularly critical: learners’ interest and readiness to engage actively and learn everyday practices. Similarly, Marchand (2008) also emphasises the importance of this interest or agency in referring to apprentices needing to ‘steal’ knowledge they are required to learn because it will not be taught them or otherwise made explicit. Instead, they must actively and surreptitiously acquire this knowledge through observation and imitative action. (Webb 1999) suggests the word apprenticeship is found within Latin – *apprehendere* – to seize, lay hold of or to seize with the mind. These conceptions commonly emphasise the active processes of human meaning making as is manifested in mimesis. In his study of Japanese pottery apprenticeships, Singleton (1989) states the word for apprentice is *minarai*: one who learns by observation. Apprentices’ learning is expected to progress without didactic instruction, instead being directed by apprentices’ own interests and intentions. This learning is premised on individual experimentation and advancement and, yet with an expectation that observation and imitation progresses in unobtrusive ways, described through the phrase *minarai kyooiku*. Yet, this principal is exercised in such a way that Singleton (1989) claims even this has to be discovered by the apprentice. There is, for instance, expectations that apprentices will understand, anticipate and respond to their master’s needs without being told. All of this is required to be learnt, not told or taught. This kind of understanding or anticipation is analogous to what is referred to as ontogenetic ritualisation (Tomasello 2004) – the process by which partners come to understand each other’s preferences and bases for engagement.

Yet, even in circumstances and occupations where intentional arrangements are made there is still a need for learners to observe, imitate and practice to learn what

has been demonstrated and spoken about, and, subsequently, practice independently. This is the case when learning to make Yurts (i.e. tents), eagle training (Bunn 1999) and when direct inter-personal guidance is provided (i.e. master potter laying hands on those of the novices to show how to form a pot through the use of the hands) (Singleton 1989), and where verbal instructions are also provided (Gowlland 2012). So, mimesis is not restricted to circumstances outside of educational programs, it applied both within and outside of them. Sinclair (1997) also refers to the practice by medical students of using observation to identify conditions in people that they observe in public situations, thereby emphasising the practical importance of this process to both work and learning. So, in these accounts, the central elements that underpin and empower mimesis are learners' readiness, interest, intentionality and agency. As noted at the beginning of this chapter, workers consistently report learning occupational skills in workplaces and/or through the circumstances of work refer to analogous processes (i.e. opportunities to observe and listen, 'just being there', 'just doing it') (Billett 2001) to what comprises mimesis. Moreover, analyses of baking apprentices learning in their workplaces (Chan 2009) and other kinds of workers consistently report instances of how these kinds of processes are central to their learning through work and in workplaces (Billett 2006), often occurring outside of direct guidance of more experienced co-workers. Importantly, beyond initial preparation for the occupation, many of these workers refer to similar processes of learning across their working lives.

Beyond these anthropological and ethnographic based accounts of learning through work, developmental theorists also concur with such propositions. Iacoboni et al. (1999) notes that imitation has a central role in human developmental and learning of motor, communicative, and social skills (1999, p. 2526). Indeed, flexibility and variability in imitative action is common practice for very young children (Hayne 1998). In fact, Hayne (1998) claims Piaget may have underestimated the potency of imitation in children's development, and the extent and flexibility of its use by even the youngest of children. Instead, mimesis is claimed by these theorists to be premised upon and enacted through conscious higher-order processes, such as monitoring, evaluating, identifying causal relations, analogy, and active cognitive processes including the generation of multimodal and sensory representations that are contemporaneously referred to as simulations (Barsalou 2008). These representations are based upon a range of contributions captured by sensory and neural processes. But they also require individuals to inquire, understand, piece together, extend, and to complete incomplete aspects of what is being observed and engaged with, based upon what they already know. So, similar to many other cognitive accounts and processes these suggests that there are both highly situated and also meta processes at play here. Again, this reinforces the idea that imitation is a lower-level cognitive activity. This process is analogous to what Valsiner (2000) refers to as engaging their cognitive experience, based upon their pre-mediate experiences, those that arose earlier or what (Gergen 1994) refers to as drawing upon events from the past. Mimesis also requires individuals to understand the intentions, actions and goals which the person who is being observed is demonstrating. It includes the ability to understand the other person's perspectives, intentions and goals, which

ultimately enables cultural learning (Tomasello 2004). This enabling extends to the contributions of artefacts and practices which are, “exemplified prototypically by the use of tools and linguistic symbols, which invariably point beyond themselves to the phenomena for which they have been designed” (Tomasello 2004, p. 52).

Such propositions suggest two different kinds or levels of imitative activity are at play in these processes: (i) copying the organisational structure of behaviour and (ii) copying the surface form of behaviour (Byrne and Russon 1998) which implies that, for the former, individuals need to develop a hierarchical structure of actions, something long acknowledged in developmental psychology (Kosslyn 1994). Following Piaget, Byrne and Russon (1998) point out that complex behaviour is constructed by combining and coordinating low-level components (e.g. mental, perceptual, or motor schemes) into novel sequences (p. 677). Indeed, Meltzoff and Decety (2003) suggests imitation is innate to humans and precedes mentalisation, and also provides the foundation for social cognition, including empathising (i.e. understanding others’ minds) with the social partners with which individuals engage (p. 491). So, this cognitive process is not just an acceptance of what is being experienced, it is an active engagement with it, which can extend to its rejection. Indeed, individuals can be selective with what they elect to engage (Baldwin 1898): albeit informants and/or other sources from the social and brute world. The cultural psychologist Valsiner (1998), for instance, states that we manage the social suggestion in person-particular ways. We cannot and do not respond to everything that is suggested by the social world as this would be overwhelming. Instead, we learn to rebuff, ignore and not engage with much of what the social world is suggesting to us and select only those suggestions we believe are important or relevant for us. Glenberg, Schroeder and Robertson (1998) refer to the common human habit of averting our gaze to limit the suggestions from the world beyond us, as we seek to process what we have experienced or about which we are engaging in introspection. So, part of individuals’ mediation of the social suggestion is the ability to exclude extraneous and unhelpful demands on conscious thinking. As mentioned, Berger and Luckman (1966) refer to the social world being unable to project its message uniformly and comprehensively, on the one hand, and to be perceived as suggested, on the other. That is, individuals’ observing and hearing are not just unidirectional processes of transmission and unconditional acceptance, as early behavioural accounts might propose. Instead, the mediation of what is experienced and its particular construal by individuals comprises a dual or bidirectional process (Valsiner 1994). Whilst individuals cannot wish away the suggestion of the social and brute worlds (Searle 1995), they can mediate how they elect to engage with them. So, processes of engaging with the social world through mimesis are not passive. They can be highly intentional and intentionally focussed process. Importantly, they also stand to be foundational and fundamental, and underpin much of individuals’ cognition, and therefore learning.

The perspectives offered above emphasise traditions and practices largely taken within anthropological, sociocultural and developmental accounts. As such, they are concerned with how the process of mimesis represents the ways humans cognitions engages with and learn from the suggestion of the social world – inter-psychologically

or inter-mentally as Vygotsky is held to have preferred (Wertsch and Tulviste 1992). However, as foreshadowed earlier such accounts may not always fully consider the intra-psychological or intra mental processes as Vygotsky also preferred. That is, those within the person. Therefore, to offer a comprehensive account of mimesis and its contributions to human cognition, learning and development, necessitates going beyond description of inter-personal processes. For instance, the developmental psychologists Iacoboni et al. (1999) suggests that “the neural basis of imitation and its functional mechanisms are poorly understood” (2526), not the least because the processes securing the ontogenetic legacy (i.e. learning) through observation and moment by moment learning (i.e. micro-genesis), such as imitation and introspection, are not easily accounted for within the kinds of enquiries based on inter-psychological processes discussed above. Hence, there is a need to consider how the intra-psychological processes serve to enact and make these processes effective.

33.5 The Intra-psychological Premises of Mimesis

In the section above, it has been proposed that in many, but not all, accounts that processes of mimesis are demanding, complex, and possibly foundational to human cognition including how we engage with and learn from others inter-psychologically – between individuals and the world beyond their skin. Yet, this process is also shaped by what occurs within the mind: the sensory and neural system. That is, the brute facts that comprise the intra-psychological or intra-mental process. Meltzoff and Decety (2003) claim that imitation are innate to humans, and precede mentalisation, suggesting bases through which what is experienced is understood. In echoing the sentiments of Baldwin (1894) and Inhelder and Piaget (1924), Hayne (1998) also suggests that “behavioural imitation and its neural substrate provide the mechanism by which theory of mind and empathy develop in humans” (p. 491). That is, these authors hold the importance of understanding others’ perception as being a foundation of social cognition through coming to understand the behavioural states of others and, through this learning, coming to empathise with others, because ‘they are like me’. Fundamentally, they claim “that nature endows humans with the tools to solve the ‘other minds’ problem by providing newborns with an imitative brain. In ontogeny, infant imitation is the seed and the adult theory of mind is the fruit (p. 491).” The claim that there are fundamental and even possibly evolutionary premises for mimesis is supported by a range of accounts from disparate disciplines. The anthropologist Jordan (1989) holds that learning based on imitation and behavioural matching is an ancient phenomenon for the human species and is rooted in our evolutionary history. She claims that whilst learning through observation and imitation is important in all higher social animals, “it is humans who have developed this propensity into the primary modality for the acquisition of skills” (p. 931). Jordan suggests that human evolution has developed adaptive capacities including changes in the brain size and structure and this leads to plasticity in learning. Yet, this adaption is also fundamental to social interaction.

Tomasello (2004) proposes that human learning is always cultural learning “because human beings, even when quite young, are able to understand the intentional and mental states of other human beings” (p. 58). This claim concurs with suggestions above that these processes provide attributes for humans’ cognition that are simply unavailable to other species, suggesting that cognition an essentially collective (i.e. social) enterprise. The evolutionary bases for much of human behaviour in which consciousness and self-awareness constitute causal roles was emphasised earlier by the cognitive psychologist (Reber 1992). He refers to lower self-replicating organic forms, possessed by most mobile species, with ‘awareness’ emerging for some members of some species and that these processes antedate the sophisticated and highly adaptive functions typically now regarded as what distinguish humans from other species.

From this evolutionary perspective, virtually every interestingly complex organism will be endowed with powerful, covert, information gathering systems that have critical epistemological functions. Moreover, the neurophysiological structures comprising these functional foundations are evolutionarily ancient and antedate those that serve explicit, conscious thinking systems. Reber’s (1992) theorisation emphasises the importance of unconscious processes that both antedates and underpins much of conscious thought, but which are largely ignored within accounts of human cognition. He suggests that, within psychology, unconscious processes tend to be dealt with only by exclusion; “only if you fail to show that a process was conscious could you conclude that it was unconscious” (pp. 39–40). He proposes that much of what we experience (e.g. through observation) may be available to us not only through conscious processes alone, but by evolutionary (i.e. phylogenetic) legacies that have come to shape individuals’ processes of cognition and personal history of development (i.e. ontogeny). He also suggests that we lack terms to describe these aspects of mental functions, noting that Piaget referred to high-level conscious functioning as *cognising* – to differentiate it from simpler forms of awareness that are essentially reactive and passive. The important point here is that much of what might inform learning through observation, imitation and practice is not easily articulated nor represented in ways that express conscious engagement or declaration. Moreover, and as Jordan (1989) proposes, these imitative capacities likely distinguish human’s capabilities from those of many other species. Byrne and Russon (1998) suggest that much of the interest being directed towards imitation within cognitive science is premised on evidence that whereas many non-human species are unable to learn by imitating others’ actions, even newborn demonstrate the ability to imitate. Indeed, these authors claim that a tradition of distinguishing certain kinds of imitation as cognitively complex can be traced back to the last century. Certainly, it is evident in the findings of Baldwin and Janet (see Valsiner and van der Veer 2000). Indeed, some of the first avowedly social bases for learning proposed in early psychological thought referred to processes that are now captured as being imitative, although perhaps most strongly within early behavioural traditions (Thorndike and Woodworth 1901). Consequently, it is now appropriate to consider what constitutes the intra-psychological qualities of mimes and its role in cognition, and in particular human learning and development.

Both longstanding and more recent findings from within cognitive science and developmental psychology about the representation of knowledge in memory offer insights into processes comprising mimesis. These include how it assists represent what has been experienced and then its recall and utilisation. Rather than verbal and other forms of declarative knowledge, these representations comprise kinds of knowledge that are non-declarable or discursive, yet include those captured through multi-sensory and neural processes: i.e. vision, smell, hearing and touch. These representations have been described earlier within cognitive psychology (e.g. Glaser 1984) as schemata comprising both the representation of conceptual and procedural and perhaps emotive or dispositional elements. Importantly, schemata exist independently of language, as how humans construct and organise them is not declarable. Consequently, declarative forms of representation are not necessarily central to the generation, recall and exercise of schemata (Harris 2007), as perhaps accounts from cognitive psychology might have suggested. Hence, these multi-parted or modal means permit the capturing, representation and recall and utilisation of capacities required for effective occupational performance, yet are also reliant on sensory-based knowledge, and are not wholly dependent upon declarative forms.

However, conceptions of knowledge representation in the mind became tainted with a narrow account within cognitive psychology viewing the mind as operating in an amodal way and being analogous to a computer as in processing information. This analogy was found to be erroneous because whereas humans seem to have fantastic memories, we have limited processing capacities (Sweller 1990), and the organisation of our cognition by higher forms of procedural and executive processes is premised on utilising that memory and easing the demands on conscious thinking. For example, the compilation of separate procedures when undertaking tasks realises the ability to undertake a task whilst making minimal demands upon conscious or working memory (Anderson 1982). Moreover, more recent work with cognitive science, informed by findings from radiography-imagery techniques, conclude that representations in memory utilise a range of sensory contributions in capturing, representing and then recalling and utilise those experiences (Kosslyn 1994). As noted, a term now being used to capture this kind of representation is ‘simulation’. He defined as a “re-enactment of perceptual, motor, and introspective states acquired during experience with the world, body and mind” (Barsalou 2008, p. 618). Radiography images indicate that even when engaged in seemingly simple tasks activities are occurring simultaneously across diverse cognitive processes and parts of the brain, suggesting that “simulation provides a core form of computation in the brain” (p. 619). Mental imagery comprises a foundational simulation mechanism and arises through deliberate attempts to construct conscious representations in working memory. Cognition, therefore, is not only premised on the active and engaged nature of processes of perception and action, but emphasises the importance of observation and representation that arise through experience. Indeed, simulation is associated with accounts of grounded cognition that focus on situated action, social interaction and the environment that together suggest that the cognitive system evolved to support action in specific situations,

including social interaction. Grounded cognition “reflects the assumption that cognition is typically grounded in multiple ways, including simulations, situated action, and on occasion, bodily state” (Barsalou 2008, p. 620), all of which is particularly salient and relevant for adults’ learning their occupations through mimesis at work.

These accounts stress interactions amongst perception, action, the body, the environment and other agents, typically during goal achievement (Barsalou 2008), such as when engaging in learning and work. An aspect of simulations and their evidence base is an overturning of earlier critiques of imagery and introspection as not being sufficiently scientifically grounded (Kosslyn et al. 2006). During the ‘cognitive revolution’, introspection and imagery were marginalised as explanatory concept because they could not be empirically presented (Barsalou 2008) and declarative forms of knowledge representation, therefore, became more widely used and privileged, as they are today within schooling and schooled societies. Yet, as well as encompassing a range of sensory contributions to cognitive processes and representations, conceptions of simulations urge a move away from accounts of representation of memory as largely about the passive storage of information waiting to be recalled. Instead, they appear as comprising cognitive processes associated with particular events and circumstances in which individuals have acted or engage, and at the service of perception and action (Glenberg 1997). Consequently, the premise here is that these multi-sensory derived simulations are foundations for much of thinking and acting required for work activities and interactions, as well as representation of occupational knowledge in memory.

The richness of the immediate social environment is also referred to by Byrne and Russon (1998) as providing priming for recall or (re)cognition as the presence of a rich environment is aligned to things those who are perceiving what is already know. Whilst these ideas say much about the process of experiences and experiencing, thereby emphasising localised or situational factors and their experiencing by individuals, they also suggest that forms of higher-order thinking are engaged in the enactment of mimesis. These kinds of considerations and, particularly, the concept of simulation and their exercise by higher cognitive processes, provide explanation of what workers reported in the studies referred to at the beginning of this chapter. When they refer to the importance of ‘just being there’ and ‘observing and listening’, these workers may well be referring to the efficacy of simulations, whilst not being consciously aware of their contributions. Also, engagement in authentic activities has largely been seen in terms of reducing the knowledge transfer task by closing the distance between the circumstances where the knowledge is learnt and those in which it is applied. Once it is understood that situational and circumstantial factors shape cognition in this way, perhaps it becomes clearer why the transfer or adaptability of knowledge from the situation in which it might have initially been learnt (e.g. the classroom) was often quite limited to the circumstance where the knowledge was to be applied (e.g. the workplace). So, perhaps more than making transfer ‘near’ rather than ‘far’, the richness of the physical and social environment which some have referred to extensively (Jordan 1989; Lave et al. 1984) is presumably being represented in a multisensory and richly interlinked simulations. It is these that

permit the rapid recall of knowledge through the availability of a range of situational and circumstantial clues and cues. Consequently, the findings of Tomasello (1998) and Call and Tomasello (1994) led them to incorporate observational learning of the properties of objects and potential relationships among them as being salient for learning from and through others. Moreover, assisted by metacognitive or executive processes, individuals earlier or pre-mediate experiences assist create or impute those elements which are not available to them visually or aurally. All of these processes derive not only from the richness of the particular circumstances in which cognition occurs, but also how individuals engage and interact with those circumstances. As it is, because workers are usually engaged in goal-directed activities within circumstances of practice, they are likely to be richly informing of those circumstances.

Finally, these kinds of advances also prompt a re-engagement with the idea that cognitive processes are not only multi-sensory, but also likely to be embodied. As proposed by Lakoff and Johnson (1999) and, before them, Bourdieu (1977), there has been a denial of the embodiment of knowledge, probably because of the privileging of declarative forms of knowledge and knowing. So, just as Ryle (1949) advocated for the ghost in the machine to urge for the recognition of procedural capacities within accounts of cognition, and more recently the need to place dispositions centrally within accounts of knowledge and knowing by Perkins, Jay and Tishman (1993), the range of sensory contributions is evident in the kinds of accounts that have just been referred. Indeed, they all suggest that processes of human thinking are much more than a narrow and unimodal cognitive process. Certainly, these processes position memory working in the service of perception and action (Glenberg 1997), as much as just stable knowledge. Perhaps in short, and as Marchand (2008) suggests, these accounts extend our understanding of human knowledge and learning beyond what people really think and say, to include what they actually do.

These concepts and propositions assist understand further the learning of professional capacities through practice. They illuminates how the physical and social circumstances in which activities occur play a significant role in the cognitive processes that comprise thinking, acting and learning: i.e. grounded cognition. Considerations of rich environments include those providing an array of contextual information that situates, informs and mediates the activities and/or interactions being engaged with or learnt through. Of course, such considerations are hardly new. The situated cognition movement of the 1990s emphasised just these factors: that there were particular cognitive consequences associated with the circumstances in which individuals engaged, the kind of activities in which they engaged and the social partners with whom they interacted (Brown et al. 1989). This movement emphasised the importance of authentic activities and the need for practice-based experiences to be included within educational programs preparing individuals for specific occupational outcomes and a call for other kinds of educational processes to be enriched by embedding them in particular and applied contexts. Moreover, the kinds of accounts emanating from cognitive science extend to and inform how suggestions from the social world shape cognition and in ways that

cannot be dismissed simply as being asocial contributions. Seemingly, the concept of simulation offers bases for understanding the potency of mimesis being enacted in learning experiences that are situated in authentic instances of practice. It also emphasises the importance of visual imagery and the role of observation and higher-order processes that have executive functions in the organisation, representation, and recalling of the representations that comprise simulations. Moreover, these same higher-order processes appear to be supporting the processes of imitation and practice, including engaging in ontogenetic ritualisation, for instance. The concept of simulations also informs of how activities in circumstances different from those in which the learned knowledge needs to be applied may be rendered cognitively problematic because the semantic and contextual circumstances of the experiencing do not assist in cognitive processes (e.g. the way schoolroom activities and interactions are distinct from those circumstances where the knowledge needs to be learnt). The importance of multimodal representations is such that the range of modal contributions to what is experienced and how these shape cognition and, consequently, processes of thinking, acting and learning. All of these are found in the process of mimesis.

Given that these considerations are directed towards the development of professionals' capacities the final section provides both a summary and some broad suggestions about implications for practice.

33.6 Mimetic Professional Learning

In sum, the aim of this chapter is to set out what might constitute an account of adults' learning for professions and in the circumstances of work, through mimetic learning. Although no prescriptions about what should comprise the elements of such an account have yet been advanced, likely it should contain a clear statement of purpose and include accounts about: (i) the processes by which mimesis (including observation) occurs and the bases of its efficacy; (ii) the kinds of outcomes (i.e. learning) that it generates; and (iii) bases for understanding procedural implications (i.e. how mimesis might be utilised and enhanced). It follows then, that in this final section these are tentatively set out, drawing from the discussions above.

33.6.1 Processes Through Which Mimesis Assists Learning

Mimesis has long been acknowledged as a process of learning, yet likely has a far greater role than was ever or is currently understood. Observation and then imitation not only require higher-order cognitive functions, but they may well contribute to all levels of cognitive activity given the salience of images, sensory input and groundedness. Certainly, fundamental processes of cognition, comprising perception,

action and introspection or individuals' construal and construction of what they experience, are premised on the contributions of observation and engagement of the kind that comprises imitation. In this way, these processes assist both the generation and utilisation of the representations of knowledge in memory referred to by some as schemata (Glaser 1984) and by others as simulations (Barsalou 2009) albeit given their distinct emphases. Moreover, because these representations are generated through individuals' engagement with what they experience they are likely to be person-dependent to some degree. Yet, these experiences and how they are experienced provide the rich contextualisation that furnishes clues and cues, forms and norms that constitute elements of these representations. Hence, as well as being person-particular, by degree, they are also shaped through multisensory and neural means by the contributions of the physical and social settings in which individuals engage with what they experience: the circumstances of work practice, for instance. Hence, both the embodiment of knowledge and its situational groundedness arise through individuals' experiences. Yet, individuals' perception or construal, action or construction as well as introspection will be premised upon: (i) the degree by which, at one level, individuals exercise their cognitive capacities in monitoring, directing energy and reconciling what they experience, (ii) qualities of human cognition that may be beyond conscious recall (i.e. unconscious consciousness), yet have arisen through individuals' experiences and phylogenetically (i.e. human history) and (iii) executive functions which are also beyond easy recall, yet seemingly play an important role in this process. In this way, the generation and utilisation of representations in memory is founded upon individuals' epistemological interest, sensory and neural processes, unconscious capacities and some kind of executive functions.

33.6.2 Outcomes That Arise Through Mimesis

Following from the above, the outcomes that arise through mimesis comprise both declarable and non-declarable elements; that is, those which can be stated, and those which not only cannot be easily stated, but may even extend to being beyond direct conscious engagement, and, therefore, control. So, at one level, the grounded and situationally-rich representations provide bases that are tangible and real and both inform and support the enactment of associated representations, such as visual imagery. Yet, at another level there are executive functions that reflect the organisms' intentionalities, which are difficult to articulate, and yet which cannot be readily declared or engaged with consciously. It seems it is this combination that workers across a range of studies included in this chapter refer to as being directly helpful when individuals engage in work-related activities in ways that allow them to observe, listen and then reproduce what they have observed and heard. Of course, this groundedness also explains the limitations that often arise when knowledge learnt in one circumstance resists being applied in other circumstances because the elements which comprise the images, embodiment and other

sensory input are remote or absent. In this way, there are limitations when the circumstances to which the knowledge is to be applied is different from the work in which it was learnt, and when individuals are unwilling, unable or incapable of applying the higher-order cognitive functions in abstracting from the particular situation the elements of the simulation or construal that are relevant to another situation.

33.6.3 Procedural Implications

The procedural implications here suggest the importance of engagement in experiences that situationally-ground the cognition and, therefore, adults' learning of what is experienced. Consequently, opportunities for individuals to engage in situationally-authentic circumstances such as workplaces, and the capacity to work alongside, with or in reasonably close proximity to those who are more experienced and whom they can observe and use as models to monitor their own performance relatively would seem to be essential. Moreover, having close guidance (i.e. direct interpersonal interaction) when engaging with knowledge that is unlikely to be learnt by discovery alone may well be essential to enrich the process of construction and develop robust simulations. Hence, providing opportunities for engaging in the circumstances of practice and for periods of time, perhaps different kinds of circumstances supported by the opportunity to consider and compare what is being experienced across these settings will be supportive of effective mimesis. Then, to reconcile differences in what is being experienced and, then to incrementally engage in activities providing experiences for imitative performances to be trialled, honed and for the individuals to move towards increasingly mature approximation of what they have observed.

It is undoubtedly the case that the acceptance of mimetic learning at work will not come easily. In schooled societies where direct guidance and teaching are privileged and self-directed learning is seen as being a high level process, rather than an everyday necessity, it will be difficult for it to be roundly accepted. Indeed, there should be caution about its acceptance and use, because there is still a need for the learning of and for the professions to be realised through inter-psychological processes as more independent forms of learning. Yet, even when engaged with a more experienced or expert other as in teaching or being guided, mimetic learning still has a central role. Moreover, given the current theoretical privileging of social forms and norms and guidance, it is unlikely that unfashionable conceptions such as mimesis will be easily accepted as it challenges the orthodoxy of much of what is currently accepted in accounts of adult learning and development. Nevertheless, the body of research, broadly cast, which is presented here suggest that it would be wrong to simply continue with such orthodoxies. Instead, we need more comprehensive and compelling accounts and these are perhaps those that can be provided through the kind of ideas, concepts and evidence that is provided through these literature.

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Part V

Implementing and Supporting Professional Learning

This part comprises contributions reporting on processes of and practices for the ongoing development of professional competence (i.e. professional development), with a particular emphasis on how this kind of learning arises through practice-based strategies. Anton Havnes and Jens-Christian Smeby commence this part with their contribution – *Professional development and the professions* (Chap. 34), in which they state that ongoing professional development is a part of being a professional. They note that the completion of initial professional preparation is in the beginning of a process of ongoing learning across working life. Indeed, they note the way that this process commences as graduates learn to engage in independent professional practice which includes learning about local requirements and contexts, and the kinds of skills they need to develop to be effective in the work setting (i.e. professional competence). They highlight the tension between the importance of theoretical knowledge being enacted in practice circumstances and the needs for the teachers, nurses and engineers they focused upon to appropriate and accommodate the aspects of professional practice required to be professionally competent. Taking a very similar orientation, P. Robert-Jan Simons and Manon C. P. Ruijters' case is exemplified in the title – *The real professional is a learning professional* (Chap. 35). They argue that the earlier concept of 'learned professions' has currency in contemporary times because whilst elements of what constitutes professions transform and are subject to critique, ensuring requirement of occupations labeled in this way is for ongoing learning to support professionals practice. Indeed, they identify sets of characteristics held to be associated with professionals each of which has a strong association with learning. All of this leads them to conclude that 'learning professionals' is a title which best captures the contemporary requirements and proposes ways of learning that can support learning professionals.

Adopting a different approach to the previous contribution, Filip Dochy, David Gijbels, Elisabeth Raes and Eva Kyndt consider the importance of – *Team learning in education and professional organisations* (Chap. 36). Their chapter sets out something of the traditions and developments of learning within teams and with others as a form of collaborative learning which extends to engagement in

intentional educational experiences such as problem-based project-based learning. This foundation is then extended an elaboration of a series of models of collaborative learning in teams and identifies different kinds of time arrangements and focuses for learning collaboratively in this way. In doing so, they offer the readers some models, if not a typology, of collaborative learning approaches. Following this theme of learning through teams and oriented towards considerations of the way in which communities of practice and knowledge networks can assist professional learning, Victoria Marsick, Andrew K. Shiotani and Martha A. Gephart's chapter is aptly titled – *Teams, communities of practice, and knowledge networks as locations for learning professional practice* (Chap. 37). They offer a critique of considerations of both individual and collaborative learning and draw upon how groups of people come to learn together and enhance practice outcomes that are the focus of common concerns. They focus upon the well-known concept of communities of practice and extend their discussion of collaborative learning to a consideration of the process of knowledge sharing and learning arising through networks as contemporary formulations of shared and collaborative practice. In doing so, they offer important considerations for the enactment of collaborative learning occurring in practice settings and also for the development of professional practice.

Taking the perspective from human resource development, Rob F. Poell and Ferd J. van der Krogt advance and discuss the nature of learning network theory as a means for understanding and organising learning in and through work settings. Their chapter – *The role of Human Resource Development in organizational change: Professional development strategies of employees, managers and HRD practitioners* (Chap. 38) – uses case studies from the healthcare sector to offer empirical evidence of the way in which workplace innovations and worker learning can proceed as informed by the learner network theory. Key contributions here include both independent and interdependent learning processes being enacted through these approaches at the heart of both, however, is the kinds of networks which support and sustain that learning for managers, HRD practitioners and other employees. In their chapter, entitled – *Mentoring as a strategy for facilitating learning: Protégé and mentor perspectives* (Chap. 39) – Lillian Turner de Tormes Eby, B. Lindsay Brown and Kerrin George explore the potential of mentoring as a device for supporting ongoing development in the workplace. They draw upon a review of studies that have as a common concern understanding mentoring from the perspective of the individual who is learning, as well as the mentor. A key contribution within this chapter is a framework derived from this review that sets out how, why and what conditions mentoring supports learning. Moreover, this framework also points to areas that require further understanding to inform the effective enactment of mentoring practices, including the relationships which underpin much of effective mentoring practices.

The strong links between what constitutes professionalism and ongoing professional development are at the heart of James Avis and Kevin Orr's chapter – *The new professionalism: An exploration of vocational education and training teachers* (Chap. 40). They argue that the weakening of professional practice and professionalism

has been accompanied by accountability and educational practices which position individuals as new professionals and yet offers a poorer account of professionals work, and what constitutes their development and what is held to be legitimate forms of development and practice. They call for a re-engagement with a richer conception of professionalism premised upon emancipatory dialogic models of practice and professional engagement and development. However, overall they hold that the current governance, organisational and institutional context in which professional such as teachers are construed and enact their practice ultimately restricts of the focus for and the potential of ongoing development of the kind which would deserve the label professional development. In their chapter, Tarja Tikkanen and Stephen Billett consider and related concepts of- *Older professionals, learning and practice* (Chap. 41). In all, they argue that there is a particular need to consider older professionals' (i.e. those over 50 years) learning, because of their increased presence in global workforces. However, whereas older workers generally are seen as being disadvantaged and marginalised by age and societal sentiment, many professionals' working and learning is not affected by such sentiments or the ageing process. Indeed, much of the societal, governmental and workplace concerns about older workers are sustaining the engagement and extending their employability. In this way, efforts to support that learning need to encompass both the provision of experiences and also engaging with older professionals in ways which sustain a rich working life and one they will wish to exercise and extend rather than leave the professional workforce prematurely or prior to their desire to retire.

A key governmental and workplace priority is for workers to be innovative and able to innovate in and through that work. Consequently, understanding the kinds of organisational and personal factors supporting this priority is central to securing individual, workplace and national economic outcomes. This emphasis is the central focus of Per-Erik Elleström and Per Nilsen's chapter – *Promoting practice-based innovation through learning at work* (Chap. 42). They propose that both practice-based knowledge and research-based knowledge and their integration are central to securing innovations and innovative practices as well as creative learning in and for work. They propose that the concept of creative learning can be means by which these goals are to be achieved. Essentially, they see a role for individual reflection as a mechanism for facilitating creative learning and practice based innovations. They seek to offer a practice in which reflection is a key factor for securing creative learning and innovative practices and as such, should be supported and applied within workplace settings. They hold that such outcomes may well be premised upon the formalisation of reflective processes and their associations with innovative practices at work. Finally, and aligned with the focus on innovations, Allison Littlejohn and Anoush Margaryan's chapter entitled – *Technology-enhanced professional learning* (Chap. 43), focuses on the way that technology has transformed both peoples working and learning. They propose that a means of supporting ongoing learning is through technology enhanced processes underpinned by a strong independent relationship between technology and work practice. They offer a framework that engages three interdependent dimensions of work practices,

learning processes and digital technologies. They use this framework to analyze how professional learning can be advanced in contemporary workplaces and in addressing contemporary issues and practices.

In the above, curriculum, pedagogies and organisational strategies comprising a range of curriculum and pedagogies practices have been shown as offering ways in which to secure professional capacities and identities. These include considerations of the goals and purposes for professional education and further development, and the way in which practices such as mentoring, the use of teams and the actions of professionals themselves are central to securing initial and ongoing professional competence.

Chapter 34

Professional Development and the Profession

Anton Havnes and Jens-Christian Smeby

Abstract Lifelong learning and ongoing professional development is part of being a professional. By completion of higher education a newly qualified teacher, engineer or nurse is certified for entering professional practice. Yet, they are not fully qualified for independent professional practice. Local practices in schools, industry and the health sector often require both contextualisation and recontextualisation of knowledge that was acquired in higher education. Another challenge is learning new skills, coming to terms with local work cultures and organisational structures, as well as customer, client or user relations. To what extent these requirements of learning and re-learning are recognised and valued, and how learning in the workplace is organised, varies across professions. Professional competence is grounded on theoretical knowledge which is general in nature, but in professional practice needs to be acted upon in professional contexts, under certain conditions and often in relation to unique individuals. The chapter explores what implications these aspects of professional expertise might have for the understanding of professional development and learning in the professions. Recognising the diversity of professions and the diversity of workplaces where professionals are employed we will focus on three diverse professions (teachers, nurses and engineers). What is the potential impact of the variation in the object or content of work (or the social context in which professionals work) and the valuing of and organisation of professional development?

Keywords Professions • Professionalism • Professional development • Professional learning • Workplace learning • Nursing • Teaching • Engineering

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34.1 Introduction

There is an increasing interest in postgraduate learning and professional development. By completion of higher education a newly qualified teachers, engineers or nurses are certified to enter professional practice and the profession. Yet, they are not fully qualified for independent professional practice. Newly qualified candidates have gained a considerable body of general and theoretical knowledge, and some insight into local practices during practicums, project work and/or work observations. Yet, as they enter work life they need to learn new skills, come to terms with local work cultures, organisational structures and routines, as well as customer, client or user relations. To what extent these requirements of learning and re-learning are recognised and valued, and how learning in or close to their workplaces is organised, differs across professions (Eraut 2004, 2007).

In this chapter we address professional development as an on-going aspect of professional careers, starting in professional education, but continuing during the professional career – perhaps accelerating, taking new directions or reaching another level – as the person enters the field of professional practice. We seek to address some key questions such as: Is there too much trust in formal professional qualification *for* the professions and too little weight on qualification *in* the professions? Also, recent literature reviews question the learning potential of the ways post graduate professional development is arranged, the underlying conceptions on which knowledge and learning are grounded, and where and when professional learning takes place (Borko 2004; Timperley et al. 2007; Timperley 2011; Webster-Wright 2009). Consistent with the focus on professional development, we are concerned mainly with the professions and, at the same time, build on insights in practice-based learning more generally we address further question. What is special about professions, professional knowledge, professional expertise and professional learning? What is the role of professional education in the process of qualifying for the professions? How does the structuring of work potentially sustain learning? Recognising the diversity of professions and the diversity of workplaces where professionals are employed, we focus on three diverse professions (i.e. teachers, nurses and engineers). What is the potential impact of the variation in the object or content of work, the social context in which professionals work, the institutional organisation of work, inter- and intra-professional interaction and the conceptualisation and organisation of professional learning? However, we commence by addressing some key emerging challenges in professional practice.

Professional development concerns the need for new knowledge and skills as well as updating what is already acquired. These requirements relate to important changes in work practice, increased professionalization, concerns about employability, as well as developments in the theorising of learning.

Changes in work practice and skill demands. In a study of development of work inputs and skills demands in the labour market over the period 1960 to 1998, Autor et al. (2003) found that the need of non-routine interactive and non-routine analytic

skills had expanded, while the need of routine cognitive skills and manual skills had decreased. Since 1990, the most dramatic decrease was in routine cognitive work. In the emerging knowledge economy, the handling of information in creative and productive ways is essential. Interpretation of problematic situations, definition of tasks, searches for task-relevant information, providing novel solutions and monitoring their own work are all integrated elements of professional practice in contemporary societies. The role of critical interpretation of problem situations and complex discretionary decision-making – which are key characteristics of professional practice – have increased across modern work life.

Professionalization. Another development concerns expansions in the fields of professional practice: professionalization. Over the last decades, a large number of occupations have become professionalised. Although elaborated in greater detail later, in sum in many countries higher education has expanded considerably and now includes training for a wide range of health occupations, social workers, teachers, journalists, librarians and others. Research-based and theoretical knowledge has become more essential in the knowledge base of these groups. There are increasing requests for research- or evidence-based practice. In professions, group affiliation and professional identity, as well as jurisdiction and boundaries to others, more or less associated professional groups tend to become an issue for professional practice. This practice is increasingly based on trust from society, ‘clients’ and others. Professionalization is also associated with a certain degree of autonomy in the exercise of professional competence.

Employability and lifelong learning. In higher education, there has been an increasing concern about employability – the extent to which higher education prepares for the challenges that graduates will meet when they enter the workforce (Harvey 2005; Knight and Yorke 2002; Aamodt and Havnes 2008). In addition to content knowledge, generic skills, efficacy beliefs and metacognitive competences are now being emphasised (Knight and Yorke 2004). In workplaces, there has been an increasing interest in lifelong learning to sustain employability across working lives. In 1996, the Organisation of Economic and Cultural Development (OECD) conference of ministers of education recommended member countries to make lifelong education a reality for all (OECD 1996). Similarly, the European Union has emphasised lifelong learning as a basic component of the European social model (European Communities 2008). Results from the Adult Literacy and Life Skills Survey show that close to or over half of the employed populations in the OECD countries were enrolled in “some form of organised adult education or training during the year preceding the interview” (Rubenson 2005, p. 82).

Conceptions of learning and qualification. Furthermore, over the last decades there has been a turn in the understanding of learning from learning as a distinct process to learning as embedded in practices that may or may not have learning as their primary orientation or motivation (Lave and Wenger 1991; Engeström 1987). The practice turn in the understanding of learning has two parallel and complementary core dimensions. On the one hand, knowledge and learning are viewed as contextually

situated (e.g. Lave and Wenger 1991), meaning that individual action is integral to institutional and disciplinary cultures and mediated by tools and artefacts. On the other hand, learning and knowing is embodied (Polanyi 1958; Dreyfus and Dreyfus 1986; Benner 2001; Dall’Alba and Sandberg 2006), suggesting that knowledge is personal, tacit and implicit, and may not accurately be accounted for in educational programs. This embeddedness implies two parallel developments in the understanding of learning: learning as enculturation and an individual endeavour. These dimensions accentuate that learning is a process beyond deliberate action, it also happens as a by-product of work, social practice, individual effort and in the transitions across diverse situations and practices. These developments may also be associated with the shift of focus from teaching to learning in the educational sciences and the significance that has been attributed to lifelong learning both in education and work settings.

So, it can be stated that the changing and increasingly complex work situations, the professionalization of the workforce, the demands on further qualification from employers and policy-makers and the renewed knowledge about learning in general and learning at work in particular illustrates the significance of professional development as a field of research, practice and policy. Yet, in the research literature, the issue of professional development is predominantly addressed from the perspectives of single professions. Professionalism as a general category is not usually explored extensively in these analyses. Indeed, comparative analyses across professions are rare. Nevertheless, we can build on comparative analyses of professional learning, for instance Eraut and colleagues’ work (e.g. Eraut 2004, 2007, 2010) and an analogous project in Norway (e.g. Jensen and Lahn 2005; Nerland and Jensen 2007; Klette and Smeby 2012). Another trend is to frame professionalism as being generic across professions (e.g. Webster-Wright 2009; Dall’Alba and Sandberg 2006), including other occupations and unskilled work. While we do not make sharp distinctions between professions and other occupations, we will address the continuum of professionalization in situations where higher education is a requirement for membership in the occupation, the knowledge base is grounded on research-based knowledge and there is a fairly clearly defined job description.

This chapter contributes to the discourse on professional development in two main ways. Firstly, the chapter builds on and further develops emerging ideas in the field of professional learning. These ideas challenge prevailing professional development practices and policies (e.g. Webster-Wright 2009; Dall’Alba and Sandberg 2006; Boud and Hager 2012) and represent a shift of focus from professional development programs and courses to professional learning inherent in or close to work. Our key point, however, is to build the discussion on conceptualisations of professionalism and professional practice with generic as well as profession-specific dimensions. We need to make it clear that professional development evidently starts before candidates joins a profession as a novice – in professional education. Even though the main focus here is on learning after graduation, the transition from education to work and a conceptualisation of the relationship between professional education and professional practice is also included as an important point of departure for exploring professional development.

The chapter commences by addressing some of the sociological theories on professions and professionalism and perspectives on professional knowledge and expertise. Such a wide scope implies a contextualisation of professional development and explores why professional development plays a crucial role among individual professionals and well as professions as social associations. We then go on to explore professional development, professional learning, workplace learning and learning theories. The chapter, therefore, includes a brief elaboration and comparative analysis of professional development among three professional groups – nursing, engineering and teaching. The space here does not allow extensive reviews and analyses of the professional development literature within all these fields. Yet, it is our aim to expand the understanding of professional development by combining a principal, general analysis of professions and post-graduate learning across professional boundaries.

34.2 Professions and Professionalism

Professionals are a specific type of experts. The term profession was traditionally used to describe common characteristics of an exclusive number of occupational groups, first of all physicians, lawyers and priests. More subordinated and less fully developed professions were characterized as semi-professions (Etzioni 1969). Today, the term is used in a much looser sense and simply defined as knowledge based occupational groups (Evetts 2003, 2010). In his highly influential work Abbott (1988, p. 8) defined professions as “exclusive occupational groups applying somewhat abstract knowledge to particular cases”. He added that such type of knowledge is usually is acquired in higher education. A problem with this kind of loose definition is that the concept becomes unclear (Brante 2011; Molander and Terum 2008; Sciulli 2005). Moreover, it may be argued that also traits from more precise definitions are implicitly included even though the loose definitions are emphasized. We distinguish between three stages or perspectives in the sociology of professions (Evetts 2003; Sciulli 2005). While sociologist in the first stage drew attention to professionalism as a normative value system, the second stage is characterised by focusing on professional power. The third interpretation, developing since the 1990s, is a synthesis of these earlier accounts and includes both normative and power elements.

The sociology of professions first developed among Anglo-American sociologists before and after the Second World War. Talcott Parsons (1939, 1951) is one of the most well known sociologists emphasising professions important role in modern societies. Professions are held in such accounts to contribute to social order and represented and alternative bureaucratic organisations as well as the market. He highlighted their normative value system: that their academic knowledge base and altruistic orientation provided a legitimate basis for their professional autonomy. This functionalistic approach to professionalism implied that professions are considered significantly different from other occupations (e.g. Good 1957). Moreover,

Wilensky (1964) argued in his classical article “*The professionalization of everyone?*” that the natural history of professionalization in the United States consisted of five steps:

1. The emergence of a full time occupation
2. The establishment of a training school, if they do not begin within universities they always eventually seeks contact.
3. Founding of a professional association which seeks:
 - (a) Self-conscious definition of the core tasks of the occupation;
 - (b) A cosmopolitan perspective to the practice of the occupation; and
 - (c) To compete with neighbouring occupation in order to establish the area of exclusive competence.
4. Win legal support for the protection of the job territory to gain control of licensing and certification.
5. Establishment of an ethical code to assure the public that the profession will serve its needs.

The efforts of developing distinct definitions of professions turned out not to be very fruitful as occupational roles differ as a function of the work settings within it is performed. Moreover, historical analyses have shown that the autonomy of professionals differs over time, between core professional groups and across countries (Burrage 1993). The professional ideal turns out to be based first of all on the medical profession in Anglo-American parts of the world in a specific historic period of time.

During the 1970s and 1980s, functionalism was roundly rejected and the perspective of professionalism as a value system was often replaced by a critical perspective focusing on professional power and self-interested monopolies. These perspectives are related to the Weberian concept of social closure. It was claimed that professionalism was a successful ideology because it was used as a basis for occupational groups in their claims and competition for status and income (Johnson 1972). Larson (1977) defined the *professional project* as a ‘monopoly of competence legitimised by officially sanctioned “expertise”, and a monopoly of credibility with the public’. The functionalistic approach that professions contribute to social integration as opposed to social control was rejected through these accounts. Professionalism was also used as a sound example of credentialism and the basis of stratification and occupational hierarchies (Collins 1979). Collins finds it striking that the medical profession had high status prior to the development of a scientific knowledge base. According to Collins, medicine before the mid-1800s, was based on virtually no valid expertise, and many of the procedures developed from ancient theories – practices such as bleeding and purging – were not just wrong, they were directly harmful. He concludes that the monopoly position and high standing of physicians before the later nineteenth century was based on fraud (Collins 1979, pp. 138–139).

The main problem of this focus on power was that it was considered as an alternative to professionalism as a value system. In the 1990s, commentators began to reassess the significance of professionalism and its positive as well as negative contribution to customers, clients and the social system (Evetts 2003). The two former

perspectives were considered complementary rather than contrary. The idea that professionals can be clearly distinguished from other expert occupations on any empirical or analytical grounds was also largely rejected. Abbott (2001) claims that the sociology of professions is a 'branch of the sociology of work concerned with the analysis of expert occupations'. Professionals are specialists that, to some extent, have succeeded in establishing an area of exclusive competence and discretionary space. Sharp and clear borders have been used as defence towards professional groups that might seek to encroach and are a means to maintain professional jurisdiction (Abbott 1988, p. 56). The concept of boundary-work (Gieryn 1983) has been developed to describe how occupational groups develop and maintain such borders towards other occupations as well as lay people (Pyykkö et al. 2011). Boundary-work and strong professional identities are key barriers to collaboration.

Freidson (2001) also aims to overcome the two former traditions. He prefers focusing on professionalism as an ideal type rather than distinguishing between professions and non-professions. His main argument is that professionalism is a unique form of occupational control that has distinct advantages over market, organisational and bureaucratic forms of control. He accepts arguments from the critical traditions that professions also advocate own interests, but based on the perspectives from Parsons and others he argues that professionalism is based on a third logic that provides a desirable way of providing complex, discretionary service to the public. The basis for public trust is first of all their specialised scientific knowledge base, but also collegial control and legal licensing.

As advanced above, professions and professionalism are contested concepts. The different perspectives have significant implications for our understanding of professional knowledge and expertise as well as professional education, learning and post-graduate development. We first examine the characteristics of professional knowledge.

34.2.1 Professional Knowledge

Professional knowledge is central to professions and the identity of professionals. Professional development – both as practice and research – would benefit from being more firmly grounded on a conceptualisation of what it implies being a professional. This is because it needs to be informed by what characterises professional knowledge in general and the domain-specific nature of professional knowledge.

In the traditional sociology of professions, the sciences were the very basis of professional knowledge. Parsons and Platt (1973) argue that professional competence has to be grounded in bodies of theoretical knowledge. The medical profession is an ideal type in this respect as basic science underpins the practice of medicine. The professional knowledge bases compose relevant knowledge from a variety of disciplines. Parsons and Platt (1973) discuss the extent to which a number of occupational groups will develop into newer professions focusing on the development of their cognitive knowledge base. They find promising developments within

administration and teaching, but argue that social workers will not succeed because of the precariousness of the cognitive (i.e. scientific) basis of their occupation. From such a perspective, professional competence is first of all characterised by a theoretical knowledge base. There is an extensive literature, however, on the nature and importance of practical knowledge that challenge such a perspective. Polanyi states that “We can know more than we can tell” (Polanyi 1966, p. 4). He argues that our body is the ultimate instrument of all our external knowledge. The skill of a driver can, for example, not be replaced by thorough schooling in the theory of motorcars. Furthermore, as professional skills are appropriated the conscious, reflective aspect of skills might change. As both Polanyi (1966) and Dreyfus and Dreyfus (1986) argue, while being conscious about how to perform effectively at an early stage, it might be automated and drop out of conscious attention at a later stage. These perspectives have significant implications for our understanding of professional knowledge. In the literature, different concepts are used to characterise various types of knowledge. To include these various aspects, the relationship between theoretical and practical knowledge, in a broad sense, need to be emphasised.

Sociologists of professions recognise that professional competence composes abstract theoretical knowledge as well as practical abilities. Professions are seen as characterised by combining these two types of knowledge even though the former is emphasised. The combination of theoretical and practical knowledge distinguishes professionals from, on the one hand, crafts persons, who emphasise techniques per se (Abbott 1988, p. 8) and typically receive their training on the job as apprentices (Freidson 2001, p. 89), and, on the other, academics, who are primarily concerned about pure disciplinary knowledge and knowledge for its own sake. The distinction between craft persons, professions and academics are ideal types. In practice, these distinctions are blurred. Crafts may also base their work on science and theoretical knowledge and universities now are increasingly being seen as providers of higher vocational education (Billett 2009).

While some type of knowledge may be formulated in a highly abstract way and, therefore, not related to a specific context, other types presuppose personal experience in a concrete context (Grimen 2008). Nevertheless, we would like to stress that the distinction should be understood as a continuum and that no knowledge is purely theoretical or practical (Grimen 2008; Polanyi 1966). Moreover, even though some of the knowledge is first of all theoretical and practical, the challenge in all professions is how these various dimensions relate to each other. What comprise the unity of a professional knowledge base are meaningful relations to professional practice. In the discussion of relationships between theoretical and practical knowledge it should be recognised that theoretical knowledge is not just a basis for professional problem-solving; professionals also have to provide scientifically-based arguments to defend their diagnoses and decisions. The role of practical skills and personal experience is heavily emphasised in the literature on skillfulness (Benner 2001 [1984]; Eraut 1994, 2010; Schön 1987). Much of the emphasis within this tradition is on learning from experience with only occasional reference to theoretical knowledge. These studies do not challenge the basic assumption in the sociology of professions that theoretical knowledge is a basic characteristic of professionalism,

however. The key question is what comprises the relationship between theoretical and practical knowledge. Also, a sociologist of professions has argued that the use of theoretical knowledge is less practical than symbolic (Abbott 1988). The problem with the distinction between theoretical and practical knowledge is that it often is treated as a duality and separate types opposed to each other. Intuition is, for example, part of what we have termed practical knowledge and also often is characterised as tacit knowledge. Some endow intuition with an almost magic aura contrary to knowledge acquired by a rational process, while for example Simon (1992) emphasises that “intuition is nothing more and nothing less than recognition” (Kahneman and Klein 2009). While the former perspective implies a dualistic perspective on professional knowledge, the latter opens up for a nuanced understanding of the complex relationship between different aspects of professional knowledge and the nature of professional expertise. So, while abstract academic knowledge is highlighted as an important characteristic of professions, within the sociological tradition others has emphasised the role of practical skills and tacit knowledge. The latter is further explored in studies of expertise.

34.2.2 Professional Expertise

Expertise refers to the skills and knowledge that distinguish experts from novices and less experienced people. According to Abbott (1988), professionalism has been the main way of institutionalizing expertise in industrialized countries. The sociology of professions has provided little in the way of understanding about how expertise is acquired. There is an extensive literature on expertise that addresses these issues mainly within the field of cognitive psychology, however. Expertise is used to characterize persons who are particularly qualified within their domain of activities, for example, sport, games, music or an occupation. Expertise seems to be domain specific; there is little transfer between high-level proficiency domains. Nevertheless, comparative studies indicate that there are a number of common patterns that are relatively independent of field of expertise (Ericsson 2006a). Research on how experts think concludes that experts not only distinguish themselves from novices by solving the problem faster, they also think differently. The main difference is that experts have developed an extensive set of representations that enables them to recognize what is the most relevant information in a concrete situation. With experience experts acquire large “vocabulary” or memory store, also called chunks and cues. Moreover, automaticity (i.e. the ability to do something without calling upon conscious memory) is important to expertise if higher level skills such as reasoning, comprehension and monitoring are to be proficiently enacted. Research also indicates that there is an interaction between automaticity and the applicability of available knowledge. All the paths to expert performance appear to require substantial extended effortful practice. Practice in itself is not enough; the training should be specially designed activities that provide feedback on performance as well as opportunities for repetition and gradual refinement (Feltovich et al. 2006).

The expertise literature referred to here focuses on how expert develop practical knowledge and intuition that enables them to perform and make good decisions under conditions of uncertainty and time pressure. Dreyfus and Dreyfus (1986) five stage model on the development from novice to expert and Patricia Benner's (2001 [1984]) study of excellence in clinical nursing practice based on the same model are well-known example of such an understanding of the basis of professional expertise. Within psychology, the perspective is characterised as the naturalistic decision-making approach. Another research tradition that often is considered as a conflicting is the heuristics and biases approach. Based on experiments the reliability of intuitive skills and discretion is challenged (Kahneman and Klein 2009). An important finding is that when experts think they apply a holistic generally, they generally only base their judgement on a very limited set of indicators. It is argued that statistical predictors often are more accurate than human predictors (Kahneman 2011). Moreover, studies of medical misdiagnosis conclude that the majority is due to cognitive errors (Groopman 2008). Several studies have confirmed the persistence of a diverse set of intuitive errors in judgment made by professionals. Subjective experience is, therefore, not a reliable indicator for judgment accuracy (Kahneman and Klein 2009). The key problem is that it is difficult for the expert to separate beforehand when his or her intuition is highly valuable and appropriate and when it is a biased impression. Feedback and collegial deliberation are suggested as appropriate to develop professional expertise and prevent errors (Kahneman 2011).

There are also differences between expert domains with respect to which there are objective criteria for assessing expert performance. Shanteau (1992) has examined differences in reliability among expert fields. He argues that it has to do with the characteristics of the respective tasks, first of all the predictability of outcomes and the availability of good feedback. Moreover, he pointed to static as opposed to dynamic stimuli as favourable to good performance. Even though he does not mention it explicitly, engineers may reasonably be categorised among astronomers, physicists and mathematicians as an example of reliable experts, while teachers among clinical psychologists, psychiatrists and court judges is an example of poor performing experts (see also Stark 1998). He characterised among others nursing as "fractionated expertise". These professionals exhibited genuine expertise in some of their activities, but not in others. We will come back to these perspectives in our examination of professional development within teaching, nursing and engineering.

While the sociology of professions focuses on a theoretical knowledge base, extensive systematic training and feedback is emphasised in the literature on expertise and expert performance. A general conclusion in the latter tradition is the insufficiency of the traditional school system. Professional education need to help students acquire the knowledge and skills for basic mastery in the professional domain, and then allow them gradually to take over control of the learning of their professional skills by designing deliberate practice activities that produce continued development (Feltovich et al. 2006). These perspectives are essential to understand why education has to be supplemented by different types of placements, and why

professional development of newly qualified graduate, as well as experienced professional, is of significant importance. Both considerations of professional knowledge and expert performance leads to accounts of how professional education should best proceed. The limitation of professional education is emphasised within studies of expertise as well as the sociological tradition focusing on education primarily as credentialism.

34.2.3 *Qualifying or Certifying?*

Although there is general agreement that one of the core characteristics of professions is a body of abstract codified knowledge obtained in higher education, the reasons *why* this is important are heavily contested. The basic perspective within the traditional or functionalistic perspective is that education has a socialising function. Socialisation implies not only training for specific knowledge and skills, but also internalisation of certain values associated with the occupational practice. Selection is important for the purpose of allocating the most important and demanding jobs to the most talented individuals (Parsons 1959).

Higher education and abstract codified knowledge are, as we have emphasised above, considered highly important as bases for professional discretion and autonomy as well as for the development of a critical attitude to knowledge and professional practice. Professional education also has a socialising function in terms of strengthening the students' commitment to and identification with the profession and professional values (Freidson 2001). This corresponds to the meritocracy model, which presumes there is a rational and socially-productive relationship between school and work. and that individuals are rewarded based on their merits and qualifications (Bills 2004, p. 38). In this way, the meritocratic perspective matches the traditional lay perspective on the relationship between education and work.

In another approach, it has been asserted that expert knowledge is a core element in professionalism, used as a basis for occupational groups in their claims and competition for status and income (Johnson 1972). It is also argued that knowledge and skills are mainly learned in occupational life and that professional education and credentials are largely means of regulating the admission to privileged positions in occupational life (Collins 1979, 1990). The insufficiency of professional education has also been emphasised by others. Schön (1987), for instance, introduced the concept of the reflective practitioner as a critic of the idea of technological rationality as a basis of professional practice. He criticised the positivistic idea that practical competence becomes professional when its instrumental problem solving is grounded in systematic scientific knowledge. His point was not that we could not trust scientific knowledge, but that it is insufficient to cope with the "swampy zones of practice". Uncertainty, uniqueness and value conflicts escape the canons of technical rationality. He argues that 'theory in use' and artistry is a better ideal for professional education: students cannot be taught what they need to know, but they can be coached. Drawing

on Dewey he emphasises the importance of learning by doing. Reflection-in-action is a way to cope with the gap between theory and practice, he does not suggest that professional practice entirely should be based on practice.

As we have argued above, the traditional and critical perspectives on professions are not contradictory. Professional education may have a qualifying as well as a credential function. There are, however, only few studies examining the extent to which higher education has a qualifying function, and the findings of these studies are somewhat inconsistent (Bills 2004). One reason for the limited number of studies is the methodological challenge involved in examining whether education has a primarily qualifying or credential function. Education is not just an indicator of knowledge and skills. The number of years spent in education is also positively correlated with good health and job stability and negatively correlated with smoking and drug and alcohol abuse (Weiss 1995). It is, therefore, rational for employers to prefer persons with more education, not just because of their competence and skills, but as a kind of screening for unobservable characteristics. Based on the same rationale, students will choose to educate themselves not just to qualify for a future job, but also to signal their capabilities as employees (ibid.). Another reason may be that studies of higher education and workplace learning compose separate research traditions and communities and there is a lack of communication between them (Hodkinson et al. 2008). A call has been put forth for further investigation of how the knowledge and skills acquired during professional education impact the development of professional learning (Richter et al. 2010). The limitation of professional education and the need for further professional development becomes particularly evident in the transition from education to work.

34.2.4 Education–Work Transitions and Trajectories of Learning

A challenge related to examining the qualifying function of professional education is that while education may be directly, concretely relevant to performance and problem-solving in occupational life, it may also have more indirect relevance in promoting the development of analytical skills as well as motivation for future learning. From a situated perspective (Lave and Wenger 1991), the traditional cognitive assumption that knowledge learned in the context of education can simply be transferred to the context of work is challenged. Knowledge and learning do not take place in the mind in isolation; they are the products of social activities. Knowledge constitutes activities organised by networks spread across space and time. Students get connected to knowledge along trajectories, where representations such as textbooks, lectures and technical instruments are important learning sources. A trajectory perspective on professional learning is not limited to initial education. Workplace learning is of significant importance, because graduates from professional programmes are not ready-qualified. Professional clinical practice provide

experiential learning that are essential for the development from novice to expert (Benner 2001 [1984]).

“Learning trajectories” has become widely used to highlight that competence and expertise are developed over time in a number of different contexts. The term also correspond with the focus on lifelong learning and the importance of non-formal learning as well as processes related to the development of national qualification frameworks implying a shift from one-sided attention to formal credentials to a more inclusive perspective on qualifications developed in various ways. Eraut (2010) emphasises that unlike “competencies” which is a static concept, “learning trajectories” addresses progress as well as discontinuities of learning. They also include the context of performance in the learning record. An important question is what types of knowledge can be learned in higher education or are best learned in professional practice. Others types might be best learned through integrated courses involving both contexts (Eraut 1994).

The trajectory perspective has been focused from various perspectives and disciplinary approaches, however. It distinguishes between and educational, informal, organisational and epistemic trajectories (Lahn 2010). The first, *educational trajectories*, bring into focus individual strategies, stages and predictors to understand the student learning processes and the development of expertise and competence (Benner 2001 [1984]; Ericsson 2006b; Orlinsky et al. 2005; Pascarella and Terenzini 2005). The second approach, *informal trajectories* includes studies focusing on biographies and lifetime trajectories as well as historical approaches emphasising the social and institutional context of the learner (Olesen 2001; Steensen 2008). *Organisational trajectories* relate to the a situated perspective on learning emphasising “legitimate peripheral participation” (Lave and Wenger 1991). This perspective tends to focus on structural characteristics of professional communities and the temporal character of the development of identity and learning. The final one, advocated by Lahn, is *epistemic trajectories* and highlights the knowledge content of learning trajectories. The perspective is among others inspired by Knorr Cetina’s works on epistemic cultures (1999, 2006). The focus is directed towards “object centred relationships” as the basis of identities and feeling of belonging in contrast to local face-to-face social relationships. Moreover, the motivating, energy providing, and structuring aspect of “epistemic objects” is emphasised in this account.

Even though the disciplinary and theoretical backgrounds for these approaches to learning trajectories differ, the perspectives do not have to be exclusive. Instead they can be seen as diverse and supplementary aspects of the complexity of professional learning and development. Trajectories are characterised by “boundary crossing” (Engeström 2001; Guile and Young 2003) and “recontextualisation” (Smeby and Vågan 2008; van Oers 1998) and the approach is a promising way to overcome the dichotomy between the two metaphors of learning: “learning as acquisition” and “learning as participation” (Sfard 1998), since both instruction and active learning is integral to professional learning. Moreover, the epistemic perspective may be useful to “bring knowledge back in”, which implies putting the content knowledge inherent in professional competence in the forefront (Young 2008). Knowledge is

not just learning outcomes, but also a basis for identity and motivation for further learning (Jensen and Lahn 2005). A way to understand how professionals link to more abstract modes of knowledge is to focus on the process around the incorporation of students into specific temporal and spatial organisation of knowledge: how students get connected to the knowledge they need to learn (Nespor 1994; Smeby 2007). Students get connected to knowledge along trajectories where representations such as textbooks, lectures and technical instrument are mobilised. Using the basic perspectives in the sociology of profession as a point of departure, it may be argued that a core challenge is to understand how different elements in learning trajectories encourage students to connect to abstract bodies of knowledge. The literature on organisational trajectories may, on the other hand, indicate that informal learning at the workplace, first of all are related to local workplace characteristics.

34.2.5 *Summing Up*

Research on professions, professionalism, professional knowledge and expertise provides a perspective on the characteristics of professional competence and means for exploring development and learning in the professions. Firstly, professional practice is at the nexus between scientific knowledge and practical skills. It implies application of general knowledge and task- and situation-specific information and cues. Secondly, professionals provide complex, discretionary service to the public or clients. Professions serve a more or less specific function in a wide, societal division of labour. It means they have social premises as individuals and a professional collective. Thirdly, through professional associations and collegial communities, professionals uphold the interests of the profession as collective. Professional association are also forums for professional development and negotiation in society concerning their responsibility to the public good. Fourthly, the complexity of professional knowledge cannot only be learned in professional education, but requires professional practical expertise as well as continuing learning after graduation. Finally, a prerequisite for professionalism is trust from society, the public and (potential) clients. That is, trust directed towards professionals as individuals and as collective. In the modern information society, this trust implies that professionals need to be pro-active in engaging with new developments and knowledge in their field, as well as attentive to local, situational and task-specific conditions. In these perspectives, professional development – post initial preparation and graduation – stands out as a key aspect of professionalism and the being of professionals. Yet, as the proceeding discussion demonstrates, insights from sociology of professions are weakly integrated in professional developments initiatives – across policy, practice and research. While accepting the essential role of professional (initial) education, the proceeding discussion addresses professional development in the professions.

34.3 Postgraduate Professional Development

The field referred to as ‘professional development’ goes under several names and bears diverse meanings. It is a generic term that includes, for instance, pre-service professional education or initial professional education (IPE), continuing professional development after graduation (CPD), professional development programs or courses, continuing (formal) education in higher education and continuing professional learning after graduation (CPL). Eraut (2012) also links professional development to human resources development (HRD) and views it as an aspect of management and leadership. Some of these conceptions draw attention to learning in didactic settings outside of the workplace, while some emphasise learning inherent to or in proximity to on-going work practices. In other words, the disparate terminology signifies a range of initiatives to qualify for competent professional practice – pre-service or in-service, didactically structured or inherent in professional practice, and might also include the organisational system of leadership, social structures, peer interaction and self-directed learning inherent in work. There are diverse interest groups involved in providing professional development programs and courses, as well as providing support for professional learning and development within institutions, such as higher education institutions, professional associations, public agencies, private enterprises and individual experts with diverse affiliations. The diverse framings and the diverse interest groups involved also imply that there are potentially conflicting understandings and approaches to professional knowledge, learning and development. We cannot here go into details in these diverse framings and their implications. Instead, we will address some key dilemmas in recent analyses of the professional development field by taking Webster-Wright’s (2009) critical review as a starting point.

Webster-Wright (2009) found that a training model dominates the professional development field. The focus is mainly on professional development programs and training courses away from the workplace or the professional setting. The teaching professions dominated the professional development literature followed by health professions. 65 % of the studies were from these professional fields (40 % and 25 % respectively). The technological professions (including natural and physical science) were represented by only 6 % of the studies. Of the 203 studies she reviewed, 51 % were commentary studies, describing PD programs and participants’ learning. 36 % were program evaluation studies. Only 13 % were classified as critical studies “that in some ways disrupted traditional notions of PD” (p. 709). Moreover, 81 % of the commentary studies “reinforced the traditional notions of PD” (p. 710). There is “a focus on programs and content rather than on learning experiences [...] Firstly, the term ‘PD’ is part of a discourse that focuses on professionals as deficient and in need of developing and directing rather than on a professional engaged in self-directed learning” (p. 712). A transmission model where information is delivered in a didactic, school-like manner dominates (see also Dall’Alba and Sandberg 2006). PD policies seem to be dominated by the acquisition model of learning (Sfard 1998; Boud and Hager 2012). Professionals (or learners’) agentic approach to learning is

not emphasised in this traditional way of framing professional development. Secondly, the contexts of professional development and learning and the work contexts are separate (*ibid.*). Webster-Wright doubts that PD programs will result in professional learning or make any impact on professional practice. She gains support from Timperley (2011). In her recent book, *Realizing the power of professional learning*, she maintains that the huge investment in professional development “has failed to meet its goals” (Timperley 2011, pp. 1–2, see also Hanushek 2005), because what individuals learning in professional development courses outside of the institution rarely have any impact on the practice when they back in their workplace. Borko (2004, p. 3) states that despite recognition of its importance, teacher professional development is “woefully inadequate” because it is “fragmented, intellectually superficial, and do not take into account what we know about how teachers learn”. Eraut’s (1994, p. 13) claims that professional development “all too often provides yet another strand of separate, unintegrated and therefore minimally used, professional knowledge”.

These concerns about the disconnection between professional development initiatives and work weakening professional learning also resonates with research on transfer (Detterman and Sternberg 1993; Carraher and Scliemann 2002; Packer 2001; Greeno 2006) and, for instance, research on learning skills intervention programs in higher education (Hattie et al. 1996). For such courses to have impact on learning they need to be situated in the target activity and problem solving. Hattie et al. (1996) demonstrated that to enhance transfer to new tasks and situations, learning skills interventions need to be integrated in students’ subject matter learning to be effective and also include a meta-perspective on learning. While it is uncertain to what extent research findings from formal education apply to professional learning beyond graduation, the principle might apply for professional development courses and program as well. The key challenge in understanding professional learning implies addressing “‘the learning experience’ as constructed and embedded within authentic professional practice” (Webster-Wright 2009, p. 713, see also Dall’Alba and Sandberg 2006; Hodkinson and Hodkinson 2005; Timperley 2011; Boud and Hager 2012).

To improve the learning potential of professional development initiatives Timperley (2011), like Webster-Wright, advocates a shift from professional development – which “has taken on connotations of delivery of some kind of information to teachers in order of influencing their practice” (p. 4) – to professional learning – which “implies an internal process in which individuals created professional knowledge through interaction with information” (p. 5). Work itself should be the centre of professional learning. Timperley’s (2011) analysis concerns the teacher profession. A key point is that professional development for teacher need to be situated close to the teaching practice and its main goal: students’ learning. Likewise, we could argue that professional development for nurses should be situated in proximity to the provision of health care, and close to the development of technical solutions for engineers. Webster-Wright (2009) also specifically asks for such a change in terminology from ‘development’ to ‘learning’ and proximity of learning and work.

Timperley et al. (2007, see also Timperley 2011) reviewed professional development projects in schools in New Zealand where the focus has been on supporting professional learning in schools combined with PD courses. They identified a set of factors that had positive impact on the teachers' performance and students' learning outcomes (p. xxvii). Teachers' engagement is essential, as well as opportunities to participate in a professional community of practice. Professional development should challenge prevailing discourses and practices. Furthermore, consistency with wider trends in policy and research and active school leadership was essential. Finally, external expertise can strengthen professional learning, but is, however, challenging, since the external expert(s) need to ensure that the other factors are intact and sustained. It follows, therefore, that teachers' active engagement in enquiry of their conceptions, practice and students' learning – that is, the substance of their work – was found to be crucial. The leadership's support in building enquiring work cultures was a drive for professional development.

Eraut (2000, 2004, 2007, 2012) takes the argument a step further by deconstructing the notion of professional learning involved in professional development. One distinction he makes is between formal and non-formal learning. Formal learning primarily takes place in educational or didactically structure settings and practices. Non-formal learning takes place in contexts and practices where learning is either an implicit by-product of some other activity (e.g. work) usually not, or rarely, attended to. The next distinction is a typology of non-formal learning dependent of the level of intention to learning – or rather attention. Firstly, there is the discrepancy between implicit learning where learning takes place unconsciously, without being attended to, and deliberate, analytic learning in proximity to the work process (e.g. decision-making, review of previous experiences or restructuring of work processes). Secondly, Eraut emphasises reactive, rapid and intuitive learning, characterised by near-spontaneous but recognisable responses on emerging challenges in the flow of professional practice. Thirdly, some learning is deliberate and analytic, and situated at some distance from on-going practices. Eraut's main point is that the main sources of professional learning and development relates to the structuring of work processes, professional relations and management and support systems in the workplace. It is essential that work sustains processes that also generate non-formal learning.

The call for a move from professional development to professional learning reveals a gap between theorising of the field and predominant policies and practices. A primary concern that follows from reviews of the field of professional development seems to be to conceptualise learning situated in professional practice, particularly emphasising the exploring of ways to further develop internal factors in the workplace that sustain learning at work. Moreover, to make explicit the role of professionals as (self-directed) learners, professional learning communities and the role of management and leadership in sustaining learning at work. There is less emphasis on how professions, as group and collegial collectives, potentially have interests in professional development. Professional development as also development of professions, not only the individual professionals or workplace collegial groups is not emphasised. For instance, Webster-Wright (2009) frames her analysis

and reconceptualisation of professional development in a generic way, making to attempts to compare professions or being explicit about potential differences across professions. Timperley (2011) addresses teachers and schools and does not conceptualise professional practice as category.

Finally, how distinctness and interdependency of PD programs and courses and work play out might be different from one profession to another and from one work setting to another. For instance, some work may be more learning-intensive than other. What needs to be learned might vary and, therefore, be supported by diverse professional development initiatives. The tasks, “client”-relationships, organisational structure and knowledge structure might vary across professions and work-sites. Diverse career patterns and opportunities for promotion might have an impact. It is possible that the impact of PD programs, courses and training could vary across professions and over time dependent of some of these factors, as well as diverse content or components of knowledge and skills within a profession. Research on professional development hardly addresses these issues.

The approach to professional learning that is emphasised by, for instance Webster-Wright (2009), Timperley (2011), Hodkinson and Hodkinson (2005) and others is largely grounded on developments in the understanding of learning that has emerged over the last 20 years or so – and still in the process of being developed. In particular, recent developments in the understanding of learning at work and everyday life underlies the critique of prevailing PD policies and practices.

From this brief review of the professional development literature the conclusion can be drawn that a core challenge in the moving forward of professional development policies, practices and research lies in the re-conceptualisation of learning from a didactical transmission-oriented approach to a notion of learning as situated in social practice, institutional cultures and structures in which learning revolves around work. The next sections address recent developments in research on learning that could guide the further improvement of professional development, emphasising both similarities and disparities across theoretical positions and research agendas.

34.3.1 Professional Learning at Work

Research on learning at work and in everyday life represents an alternative to traditional learning research, which has predominantly been conducted in laboratories and formal education. Lave has played a significant role in conceptualising practice-based learning. In her book *Cognition in practice* Lave (1988) set her agenda for investigating learning and cognition as focusing on “studies of cognition as far remote from school and laboratory as possible [...] while keeping relations with schooling continually in view” (p. 5). Subsequent work (e.g. Lave and Wenger 1991) has had great impact on learning research and research on workplace learning. The move from didactically structured PD programs and courses to work-based learning at work represents a similar shift of focus: from decontextualized to situated learning, from specifying content to designing learning processes and from

predominantly structuring individual learning to also redesigning work practices. Recent research on learning at work emphasises that knowing and learning is highly contextually bounded, situated in social practices and lived experiences, and mediated by cultural tools, institutional traditions and affordances provided by the ambient environment.

In the situated learning perspective education and work are distinctly diverse activities (see also Vygotsky 1978). Learning in educational settings is predominantly structured by curricular knowledge, didactic organisation, teachers' superior knowledge and students' need to acquire knowledge that largely is predefined. Education is fundamentally grounded on a vertical relationship between teacher and students. Students' learning is the main outcome. In contrast, professional work is primarily structured around the production of products and services (widely speaking), and presupposes knowledge and competence. In other words, on one level, what is the outcome of education (i.e. knowledge) is a prerequisite for professional practice, which has production or service as outcome. Furthermore, learning at work is more based on horizontal collegial relations than being instructed or taught by someone more knowledgeable (Havnes 2009).

As we have emphasised above, a key challenge of professional learning trajectory across initial and continuing professional development is to bridge a theoretically fragmented knowledge base, as well as the academia-profession practice gap. Such a bridging process also implies dealing with disparities across education and work. For instance, while theory and scientific knowledge is object of study in the higher education context it needs to be reframed as tool for acting in concrete professional situations in the workplace. In professional practice, theory is integrated in situated practice and embedded in the professionals approach to the flow of information and opportunities to act in actual situations or "situation types". For instance, Eraut (2010, p. 51) emphasises that learning to use formal knowledge "in practical situations is a *major learning challenge* in its own rights [...] that require *time* and *support*." (italics in original). It is a transfer process that involves five stages or sub-challenges, he argues:

1. The extraction of potentially relevant information from the context(s) of its acquisition and previous use;
2. Understanding the new situation;
3. Recognising what knowledge and skills are relevant;
4. Transforming them to fit the situation;
5. Integrating them with other knowledge and skills in order to think, act or communicate in the new situation.

Each of these steps is highly complex. Jointly, they underscore the point made earlier, that professionals face non-routine problem solving. The public trust on which professional practice rests presupposes that professionals are able to make such complicated cognitive operations and act accordingly based on integrating elements of the heterogeneous professional knowledge. van Oers (1998) has conceptualised these challenges as re-contextualisation of knowledge. Marton (2006) frames the challenge of learning across context as handling of "sameness" and "difference",

particularly emphasises the handling of difference and relearning across diverse tasks and contexts. The core problem is “to handle new situations in novel ways” (ibid., p. 531), which implies that professional development is a recurrent learning challenge for professionals.

Eraut (2004, 2007) also emphasises the organisation of work and learning from other people as key factors for sustaining professional learning. In the designing (or redesigning) of work process, relationships and structures, the opportunities for implicit, reactive and declarative learning in the presence of work might be altered to the better of to the worse. Eraut and his colleagues have identified two interrelated sets of factors that play a significant role in influencing learning in the context of work. Both sets of factors relate directly to the work activity (Eraut 2004, 2010). One the one hand *learning factors* are emphasised:

- the professional’s confidence and commitment
- challenges in one’s work
- feedback and support

When professionals are confident in their role, experience a challenging work environment and get and take part in giving support and feedback, one building block of a learning-intensive work environment is provided. Notably, “informal support from whoever was available was more important for learning than [...] formally designed helpers” (ibid.). These results resonate with, for instance, Karasek and Theorell’s (1990) findings, that effective learning “...occurs in situations that are challenging enough to be interesting but not so demanding that capabilities are overwhelmed” (pp. 170–171) – and also include social support (see also Karasek 1979).

The other set of factors is context factors:

- allocation and structuring of work
- expectations of each person’s role, performance and progress
- encounters and relationships with people at work

These are context factors in the meaning that they extend beyond the process of a specific task and a specific performance. They concern the organisation of work within the organisation, clarity of leadership and expected achievement, and work relationships within and across the work site. Notably, most of these learning factors and context factors presuppose communication and interaction in the process of work, which underscores the significance of social interaction in professional learning. While the situated nature of learning is now widely accepted, the tendency to downplay the role of the individual has been questioned. Billett has extensively argued for including the role of the self, in terms of, for instance, individual commitment, subjectivity and predispositions of individuals as key components in a situated or socio-cultural approach to learning (e.g. Billett 2001, 2006, 2008, 2009, 2010, see also Hodkinson and Hodkinson 2004; Hodkinson et al. 2008). “[H]ow individuals engage with and subsequently learn from what they experience is likely to be person-dependent in some way. [...] Learning] ...is characterised by the negotiation between individuals’ conceptions and what they experience in their interactions with physical and social environment” (Billett 2010, p. 5).

As stated earlier, Eraut has also addressed the role of leadership and management in preparing for and sustaining professional learning. Eraut (2012) advocates a broader approach to professional learning by including human relations developments (HDR) in the analysis. Management needs to take ownership of those factors that make an impact on professional learning. This wider, institutional perspective resonates to some extent with the approach to professional learning that can be drawn from Engeström's work based on activity theory. However, a key difference between their approaches concerns the nature of the relationships between individual and collective learning.

One of the key issues in Engeström's work is "Who are the subjects of learning, how are they defined and located", in addition to "What do they learn", "How do they learn" and "Why do they learn" (Engeström 2001, p. 133). It is the first of these questions that expands the perspective on learning beyond Eraut's analyses. A premise in activity theory, which Engeström builds on, is the expansion of the unit of analysis by including tools (mediating artefacts – being material or conceptual) that are applied in work, explicit and implicit rules or traditions, and the wider social and institutional system of work. His theory of expansive learning (Engeström 1987) "puts the primacy on communities of learners, on transformation and creation of culture", on collaboration within and across institutions, and on formation of generalised, theoretical knowledge (Engeström and Sannino 2010, p. 2). Who is learning, "the very subject of learning is transformed from isolated individuals to collectives and networks" (ibid., p. 5). Professional learning is basically framed as developing work, which has led to the interventions labelled "change laboratory" and "boundary crossing laboratories" (Engeström 1996, 2000; Engeström and Sannino 2010). These are settings within the workplace (change laboratory) or including people from diverse workplaces and professions involved in complex inter-professional problem solving, for instance, health care in the case of patients with multiple diagnoses (boundary crossing laboratories). In contrast to an individually oriented cognitive understanding of learning and development, this perspective particularly emphasises the institutionalisation (or collectivisation) of knowledge, for instance, in terms of institutional traditions, cultures, "codes", explicit guidelines, implicit assumptions – but also tools, division of labour and setting up of social settings for collaboration and reflection. The culturally boundedness of professional practice implies that individual learning and institutional development are interrelated.

Engeström's emphasis on activity systems highlights the wider socio-material aspects of learning. By placing the collective aspects of learning in the foreground, Engeström at the same time gives individual participation a subordinate position to institutional practice (but still a significant component of the activity and learning).

While sharing a social perspective on learning, Eraut (2000, 2007, 2010) frames the outcomes of professional learning primarily in terms of individuals' acquisition of codified, cultural and personal knowledge. We could say that the learning factors in his model rotate around the individual and his or her work practice, while the context factors rotate around the organisation of work that an individual is involved in. In other words, Eraut (ibid.) deconstructs the complexity of individual learning

and includes contextual factors as components of a theory of learning. Engeström (1987) approaches learning from another angle and deconstructs the complexity of collective practice and, the activity system, its institutional practices and organisation of work. He puts the development of work in the foreground. Engeström's main focus is on institutional practices (characterised by the cultural-historical theoretical term 'activity'), how they are potentially sustained and changed in a process involving individuals, mediating artefacts, traditions and rules, communities of collaborative individuals, division of labour, and – as the primary mediating factor: the object of the activity, what the work is about and what should be achieved. However, in both these perspectives, the object of work and the organisation of work are key aspects in learning at work.

We have earlier referred to Knorr Certina's (1999, 2001) notion of epistemic cultures, Young's (2008) emphasis on "bringing knowledge back in" and research within the ProLearn project in Oslo which expanded on Eraut's research on early career professionals (e.g. Jensen and Lahn 2005). These contributions are epistemologically within a contextual approach to learning; yet tend to add an additional dimension. For instance, building on Knorr Certina's work, Jensen and Lahn (2005, p. 309) emphasise "how professional communities may constitute themselves constructively—beyond the interpersonal and local level". That is, also beyond the institution or activity system level emphasised by Engeström. Being a professional implies being part of a community that are grounded on shared ideals and visions anchored in symbols, ideas and theoretical knowledge. They emphasise that bonds of professionalism could also be theoretical knowledge, epistemological stances and social responsibility. However, the theoretical knowledge and professional responsibility might vary across professions or groups of professions.

34.3.2 *Summing Up*

In the literature on professional development, the focal point for strengthening professional development is the move from courses and programs to professional learning as an aspect of work. Firstly, the object of work, the work itself and what should be achieved is the primary factor around which professional learning spins. Secondly, the social organisation of work is essential. Collaborative work affords learning to a greater extent than individual work. Opportunities for both short-term and frequent reactive learning and structured deliberative learning in collegial communities of practice could sustain professional learning. A key challenge is to further conceptualise learning in the workplace, while also exploring the role, time and place for deliberate learning within or outside of the work context. Thirdly, individual commitment is a requirement for professional learning. Confidence and challenge, being pushed and at the same time trusted and given autonomy, are essential factors. Fourthly, support from collegial communities in terms of (positive and negative) feedback is a key influence on learning. Fifthly, to establish these factors sustainably is hard to imagine without leadership taking ownership of both work processes and

the structuring of learning opportunities. Finally, professional practice is maintained by professional bonds to knowledge and professional cultures. However, the impact of these factors on professionals' learning is subject to a contingent relationship between constraints and affordances of work and the agentic approach from professionals themselves. The individual component is a prerequisite for learning, which implies that learning can be fostered, but not guaranteed – there is a level of uncertainty related to learning. Commitment might go in different directions. Some learning might strengthen prevailing practices or reinstitute previous practices. Other learning might bring professional practice in the direction of expertise. Professional learning among professionals might also transform professional practice at the collective level, change institutional practices and professional standards.

In terms of the prevailing policies and practices in the PD field, the change in terminology from professional development to professional learning cohere with recent developments in the learning sciences. Research on non-formal learning at work provides insights into a notion of learning that is particularly relevant for professional development and mechanisms that probably will generate and sustain professional learning. However, we find reasons to bring the notion of development back in. The perspective advocated from an activity theory perspective, as well as by the term epistemic culture, needs to be included in explicit ways. Changes in institutional practices have their own dynamics, for instance in terms of new technologies, new tools, new discoveries in research, policy reforms, funding systems, “client”-relationships, or new industries. Professional learning in terms of workplace learning is often associated with such changes in institutional practices, but the changes may appear first at the institutional level and next promote professional learning among the professionals. The notion of development has connotations to more changes taking place at more aggregated levels of organisations and collectives and direct individual change, changes in interaction and achievements. We need to make space for professional development as changes at the aggregated level of professions, not only professionals and professional practices. In the next section, we will explore professional development across three professions: nursing, engineering and teaching.

34.4 Professional Development and Learning in the Professions

We have, earlier in this chapter, elaborated on professionalism and professional knowledge and expertise as general phenomenon, that is, generics of professionalism. Such an analysis would emphasise commonalities in approaches to professional development and learning across professions. On the other hand, we have repeatedly expressed the assumption that there might be differences in how professions conceptualise knowledge, the character of professional work might vary, as well as the organisation of work, feedback on performance, social interaction and their interface with clients, the public, etc. Such an assumption leads towards exploring particularities of professions and professional disparities.

34.4.1 *Nursing*

The importance of professional development in nursing is explicitly expressed and widely shared. Fleet et al. (2008) emphasises the need of more health professional education at all stages of the educational continuum – undergraduate, postgraduate and continuous professional development. Headley (2006, p. 522) voices the view that lifelong learning “is not an option for the professional nurse; it is essential.” She describes three main categories of professional development in nursing: continuing educational development for board licensure and specialty certification and recertification; employer mandated professional development; and self-directed, self-monitored professional development. In the literature, a wide range of reasons for emphasising professional development in nursing: the work situation, accountability demands, the on-going professionalization of nursing, individual career opportunities, and the evidence-based practice turn.

After graduation newly qualified nurses enter work situations that are diverse and require varied, but distinct, competences. Competent patient care in a specific work setting will probably require additional learning and training. Eraut et al. (2004, p. 25) reported that newly qualified nurses found the transition from student to staff nurse massive. Four areas of concern were emphasised: “striving to achieve tasks, such as technical skills like drug rounds; being accountable and responsible, ‘doing everything’; and getting to know new people and equipment.” In an overwhelming work situation and patients’ needs makes it difficult to decide where to start and recognise which intervention or action is needed. Thus, prioritising work activities presents as a challenge for newly qualified nurses – a skill that is hard to learn in nurse education.

The health sector is also characterised by on-going development of new knowledge. Knowledge “changes almost daily. What is thought to be effective and supported by strong evidence today may not be true tomorrow” (Headley 2006). Up-to-date knowledge and skills and formal recertification are required. Björkström et al. (2008, p. 1381) includes in nursing competence “values, attitudes, knowledge and skills in intellectual, interpersonal and technical areas.” These are competences that are integral to patient care, interaction with and supervision of patients’ relatives, and intra- and inter-professional interaction. “Increasingly called on to perform highly skilled technical-scientific and relational work, nurses must draw on nursing sciences and the natural sciences as well as the social sciences and humanities” (Benner et al. 2010, pp. 1–2). It is not possible for students to learn all these competences during undergraduate education beyond the level of a novice in the field (Benner 2001). Development of expertise is a post-graduate phenomenon. In this perspective, professional development can be seen as “the hallmark of nurses for whom nursing is a profession and a career and not just a job. It is the ultimate personal continuous quality improvement program” (p. 523).

Nursing also implies meeting challenges from policy-makers, communities and patients. The health sector is both knowledge-shaped and policy-driven. Professional development includes not only securing up-to-date knowledge and skills directly relevant to the work. It also involves “widening accountability to patients, communities,

managers and policy makers” (Fleet et al. 2008, p. 15). Professional development is part of a strategy of improving access to health services, the quality of health services and efficiency and costs (Headley 2006). There is a complicated mix of knowledge, skills and responsibility in nursing practice in a highly diverse health sector. Public demands, patients’ rights and skilful practice all need to be dealt with in competent ways. As nursing procedures and practices face demands of being grounded on research-based knowledge, the need for professional development also expands. Professional development is a component in an infrastructure that sustains integration of research findings into practice (Henderson et al. 2005). It is a system of communication across communities of research and communities of nursing practice.

Professional development is also an element in the process of professionalization of nursing as a field of practice. It involves clarifying nurses’ competence and boundaries of nurses’ competence, as well as tasks and responsibilities relative to other health professions. It is framed as a way of unifying nurses as group of health workers by outlining collegial standards and expectations. In these respects, professional development is a means to motivate individuals to act according to standards, but also to establish – or strengthen – a collective purpose of nursing and identity of nurses. It plays a role in the evaluation of professional nursing practices, and as such it exerts a level of accountability that is internal, participatory and collaborative (Fleet et al. 2008, p. 16). Professional development prepares nurses to “exert influence and control their own practice” (Headley 2006, p. 523). Nurses gains more authority to make independent decisions and change care procedures (Henderson et al. 2005). Professional agency is enhanced for nurses as group and individuals. One way of framing professional development in nursing is to frame it as a strategy for raising the status of the nursing profession. Better nursing care for patients is the ultimate aim of professional development (Gustafsson and Fagerberg 2004, p. 271). Within all of this, professional development is primarily an individual undertaking to achieve a higher degree of professional fulfilment. It implies professional learning, which is “a process of individualized and independent thinking and practice within changing professional and social contexts” (ibid., p. 100). Professional development in nursing has its significance in the nexus of individual lifelong learning and professional development, on the one hand, and the development of the professional field and the work context, on the other. The individual involvement in caring and the significance of nurses’ personal motivation to learn are emphasised. Clinical ladder is an example of a framework for demonstrating professional development at both an institutional and individual level (Tørstad and Bjørk 2007).

In all, the literature on professional development in nursing largely addresses courses and formal professional development programs. However, there is also a growing interest in learning in the workplace, the creation of spaces for learning that affords reflection upon nurses’ experiences in patient care adjacent to nursing practice (Howatson-Jones 2012). Jantzen (2008) also emphasises experiential learning and the significance of supportive learning environments in the workplace. The workplace also serves another purpose as learning space in that “new knowledge needs a supportive environment in which to be utilized” (Joyce and Cowman 2007).

34.4.2 *Engineering*

For engineers keeping up with technological developments that comprise new products, more advanced technologies and being involved in creating new or improved products implies continuous learning. A colleague from engineering framed the nature of engineering; “on the next try, an engineer will always try to build the machine with one screw less”. In her study of software computers, Nerland (2008, p. 65) found that engineering is highly problem-driven work. Engineers are involved in “short-term loops of problem-driven learning.” Among the software engineers she interviewed there seemed to be culture of sharing insights and ideas via the Internet. Engineers accessed these resources in their problem-driven work. Eraut (2004) describes engineers as “hunter-gatherers of knowledge and resources” from Intranet and Internet. However, Nerland suggests, “the knowledge culture of computer engineers may benefit from paying more attention to profession-specific issues as a way of supporting learning and professional development” (p. 67). Also, the problem- or work-driven learning may also be short-term because it is associated with a particular task. Furthermore, it is individuals that that learns and the sharing of knowledge and skills might not be emphasised in every instance of practice.

A recent report from Engineers Canada (2009) recommends professional development policies and practices would benefit from exploring policies, practices and Continuing Professional Development (CPD) strategies in other professions. While CPD traditionally has been mainly related to technical issues there is an increasing interest in non-technical skills. A review by Markes (2006) reveals an extensive list of employability skills for engineers, many of these being non-technical skills, often skills related to communication, learning and self-monitoring.

There seems to be a mismatch between graduate skills developed during tertiary engineering studies and those needed in the workplace (Nair et al. 2009). In general, it is reported that students acquire adequate technical knowledge, but are limited in their ability to apply it (Jollands et al. 2012). Most importantly, students lack non-technical skills. Non-technical competencies include communication skills, abilities needed in teamwork and management and leadership skills (Martin et al. 2005). It is emphasised that engineers work in teams imply that communication and interpersonal skills are essential. Many engineers are also expected to take on some form of people management role. Even though there is often a focus on non-technical skills in the literature, it is emphasised that technical knowledge and skills are the fundamental building blocks of success in industry. Absence of either of technical knowledge and skills is the very basis engineering work. Interpersonal skills and abilities in communication, teamwork and management build on this foundation. A depth of technical knowledge and familiarity with technical content enhance for example the effectiveness of communication. Graduates technical, communication and teamwork attributes interact with each other in the workplace. A reason why the need of technical knowledge is not so much emphasised in the literature is that engineering education is primarily focused on the acquisition of technical knowledge (Sheppard et al. 2009). Engineering degrees are generally

broad degrees. Newly qualified engineers need to develop their knowledge about the specific field they are entering, but graduating engineers are not expected to have field specific knowledge of all industries (Martin et al. 2005). Lifelong learning is often considered highly important in engineering and is often called upon when solving problems. It is, therefore, considered important that an undergraduate engineering program develop lifelong learning skills (ibid.). Others emphasise that engineering is not an instrumental process. It is not just application of established knowledge. Instead, engineering work is basically about solving problems, but many engineering problems are complex and start off by being under- or ill-defined. Moreover, complexity is not only characterised by large number of elements and relationships between them, but also non-linear and discontinuous relationships and uncertain characteristics of elements as well as relationships (Zhou 2012). It is pointed out that creativity is the ability to respond to challenges by combining in new ways including drawing on broader range of interdisciplinary knowledge. Creativity is needed to handle uncertainty and ambiguity. It is emphasised that creativity in engineering is characterised by a purpose. It is also termed functional creativity. A four-dimensional model is suggested to conceptualise the products of functional creativity as solution to problems. It is distinguished between relevance and effectiveness, novelty, elegance and generalizability (Cropley and Cropley 2005; Zhou 2012). The critique of engineering education presented above is also emphasised in the study of U.S. undergraduate engineering education. It is concluded that the education is holding onto an out-dated approach to problems solving and knowledge acquisition. Putting theory before practice and the effort to cover technical knowledge comprehensively allow little opportunity to students to have the kind of deep learning experience that characterises professional practice and problem solving (Sheppard et al. 2009). A curriculum that to a much greater extent supports integration and synthesis of knowledge, development of persistence, skills in formulating and solving problems, and skills of collaboration is therefore called for. The lab and design projects are central opportunities to approximate professional practice.

34.4.3 Teachers

The educational sector is subject of public interests in terms of parents' expectations, national policies, concern from employers and industry about students' learning and public interest generally (e.g. Kennedy 2011). School reforms are implemented, there are new developments in the conceptualisation of teaching, learning and assessment, school districts and local communities express priorities and individual schools might be interested in developing their own profile. Schools are often in transformation and teachers are presented with mandates changing their ways of teaching. National and international tests and ranging of institutions and countries according to test results have led to considerable competition across schools, districts and countries. There is an increasing emphasis on accountability issues – in

terms of testing, but also documentation of students' progress. Hence, teachers are faced with the demands of a highly dynamic work role. Furthermore, students, subjects and subject departments, and schools as institutions and work environments are diverse and differentiated (McLaughlin and Talbert 2001, 2006; McLaughlin and Oberman 1996). The teachers need to do his or her best to help each one of the students learn. Moreover, teaching is what Eraut (1994) called 'hot action' where teachers make decisions in the immediacy and flow of action in the classroom. Teaching is highly diverse, and learning to teach is emphasised as on-going throughout the teaching career. There is considerable evidence that the school and departmental culture have impact on teachers' professional learning (e.g. McLaughlin and Talbert 2001, 2006; Hodkinson and Hodkinson 2005). While teachers usually work on their own in the classroom, teacher teams and other forms of collegial communities are set up to enhance collaboration among teachers and across subjects, but also to foster professional learning. Teamwork in schools has, however proven to be challenging, often trapped in the contradiction between organisation (or coordination) and reflective collegial communication (Havnes 2009; Sipovitz 2002).

The transition from higher education to the teaching profession has been seen as dramatic, often framed as "practice shock" (e.g. Little 1990; Stokking et al. 2003). In many countries, induction programs for newly qualified teachers have been introduced, in some cases including national standards for post graduation teacher qualification (e.g. Evans 2011; Haggarty et al. 2011). There is an increased focus on research-based education, teaching and practice. At the same time, the tradition of personal knowledge/experience-based knowledge is emphasised. The difference between research-based and experience-based education can initially be linked to different views of knowledge. In their review, Borko and Putnam (1996) claim that teacher professional learning implies multiple sets of knowledge, skills and understandings and sort these into three main categories:

- general pedagogical knowledge
- knowledge and beliefs about subject matter
- pedagogical content knowledge and beliefs (the teaching and learning of a particular subject matter)

Borko and Putnam (1996) identified a challenge for teacher professional learning in that students enter initial teacher education with years of experience with teaching – as students. Some of these beliefs seem to work contrary to the research-based knowledge taught in professional education and to professional development after graduation. For instance, there seemed to be a resistance to change and lack of acceptance of new developments in the learning sciences. With respect to subject knowledge teachers "often lack the rich and flexible understanding of the subject matter they need in order to [...] foster learning with understanding" (p. 690). Often their beliefs that are in conflict with what research-based conceptions of teaching advocated in the university teacher education program, and this applies for both novices and experienced teachers, Borko and Putnam (1996) argue. Both groups largely had matching learning needs. In particular, novices and experienced teachers seem need to further develop pedagogical content knowledge, how to teach in the subject and monitoring

students' learning. In particular, recent developments in conceptualisation of the teaching-learning relationship have implied a change of focus from teaching to learning. As students' learning has been placed in the foreground teachers need to be more precautionary about organising students' learning activities and pay more attention to assessment of students' learning outcomes. There are tensions between the traditional role of teachers to teaching as transmission of subject content and teachers as facilitators of students' learning (Hattie 2009), and the role, meaning and significance of assessment (Wiliam 2011). "Scientific research on learning has produced changed concepts of *knowledge* itself, new principles for what counts as *competent performance* and as *intelligence*, new principles for *instruction*, and even new theories of how educational *organisations* work" (Resnick 2010, p. 186, italics in original).

These perspectives on the need of professional learning among teachers largely address challenges in teaching as classroom activity, that is, for individual teachers. However, schools are hierarchical and nested systems (e.g. Resnick 2010). "The challenge to individual teachers is matched – perhaps exceeded – by the challenge to educational organizations and the policy structures within which they act" (ibid., p. 187). In the literature on professional learning and development for teachers the need of taking both the individual and system level factors into considerations. Firstly, one reason "why professional development of teachers in England is generally ineffective" is the lack of school level support systems and support (Opfer and Pedder 2011, p. 21). Because teaching is so embedded in the context of a nested activity system and interdependent activities, a key aspect of professional learning and development among teachers is also about changing the school. The mirror image of this phenomenon is that schools are repeatedly subject to educational reforms, often politically linked. For these reasons, the need of including all schools and integrating professional development in work place activities and structures seem crucial, but also challenging, particularly in the perspective that teaching is a largely individual activity in classrooms with only one teacher present. The latent conflict between traditional teaching and teachers beliefs, on the one side, and research-based knowledge advocated in teacher education and professional development add yet another challenge.

34.4.4 Characteristics of Professional Learning Across Three Professions

The elaborations of professional learning in nursing, engineering and teaching above predominantly derive from research within these professional fields. We have been able to just pinpoint a few characteristics of each profession. Taking a step back, it is possible to see patterns of communalities and disparities. Again, the space does not allow a comprehensive analysis. Eraut's model of context and learning factors can serve as one analytical tool. In fact, Eraut et al. (2004) compared engineers, nurses (and accountants) and his work largely coincides with the elaborations above.

Context factors. Eraut et al. (2004) described nurses' work situation as a "pressure cooker environment" where prioritisation was critical, often unreasonable high expectations to novices, overwork as norm and variable contact with peers (p. 30). There is a high degree of urgency, responsibilities and accountability in health care – with respect to patients, the hospital, other health professions and the maintenance of public trust to the system, nurses as professionals and the health sector. Making mistakes, for instance in giving medicine, could be dramatic. This is typically a "hot action" work situation. Eraut et al. (2004) found that engineers had a different work situation than nurses, for instance. They often worked in teams and open plan offices, had frequent informal contact with nearby colleagues and benefited from an "ask anything climate" (p. 20). In the "hot" versus "cold" action perspective engineering is large within the latter category, as they are rarely in contact with clients or working with an "object" that might respond unexpectedly in the ways patients and students might do. They work in a more long-scale perspective. Work expectations were often unclear, but learning what was needed to solve a problem was serious business. Engineering often implies working on complex project over lengthy period of time, including a wide range of expertise and still working individually with a specific component of the project. Eraut et al. (ibid) found that there were occasional meetings in teams or sub-groups providing support. However, they would also have work that was not particularly challenging. Applying Eraut's model of context and learning factors, teachers' work context typically takes place in a complex classroom situation where subject matter teaching and learning takes place alongside classroom management, meeting the needs of highly diverse students. They are working in a "hot action" situation where the next action largely is dependent on the students' response to the previous. Teachers rarely work alongside other teachers in direct contact with students. However, they are dealing with a hierarchical, nested school system where subject departments, schools, school districts and government all have a say in what is going to take place in the classroom. Teaching implies not only being on top with respect to knowing and applying subject matter, but also gaining insight into how diverse students at different levels know and are able to apply it. Across these three professions the nature of their work, the situations they work in, the interface to clients, patients or students are substantially different.

Learning factors. Eraut et al. (2004) found that nurses often experienced high levels of challenge, overwork could lead to lack of confidence, varied feedback and back up from colleagues and leaders, but also wards characterised as strong learning cultures and high level of commitment to patients. A key challenge seemed to be to find the optimal challenge, build confidence and provide support and feedback in the work setting. Engineers experienced variably types and levels of challenge dependent on work available, little contact with clients, helpful team members, but varied support in the workplace. Confidence could decline due to lack of challenge, but a range of career choices were available. For teachers challenges are high, but expectations not clarified at the level of each teacher's achievement in a way that directs the work of the day and next day. Feedback from peer teachers and leadership is weak and confidence building and maintenance has little peer and system support.

At one level, professional learning across nursing, engineering and teaching is similar. For instance, they all have to deal with a complex situation, prioritise among often competing demands, keep up with pressure and put patients' needs in the foreground. They have to apply knowledge and practice skills that they learned in professional education under quite different conditions. In highly specialised hospital wards, nurses need to learn new skills and procedures, learn more about diseases and treatment, and share information with peer nurses, doctors and other health professions. Likewise, engineers and teachers face challenges related to applying general knowledge, procedures and strategies in particular situations. There are evidently commonalities across professions with respect to how to frame professional learning and development. Yet, general knowledge and skills are accompanied by profession- and task-specific knowledge and skills. Comparative analyses of professional development and learning across professions draw the attention to both commonalities and disparities. Klette and Smeby (2012) identified four key aspects of professional learning and development among nurses and teachers: the collegial community in the workplace, material knowledge sources (e.g. handbooks, reference manuals), Internet and systematic training (professional development programs). However, teachers and nurses used these sources in diverse ways. For instance, teachers used the Internet and material knowledge source in a more generic way, searching the Internet to find material for their teaching, but not how to teach. Nurses, on the other hand, showed a more tool-like approach to these information sources related to procedures and how to solve problems. In her study of computer engineers Nerland (2008) found that they rely highly on knowledge as information distributed in global networks. While individual commitment is a key aspect of professionalism – and needs to be addressed in professional development policy, practice and research – the wider context of the workplace, the character of work and external relations need to be included. Furthermore, the professional community, the social responsibility and public trust that professions are given, the knowledge base, conceptual framework and tools, as well as the historically mediated epistemic culture of the profession may all provide implications for the implementation of professional development initiatives and programs.

34.4.5 Expanding the Analysis of Professional Development and the Professions

Shanteau (1992) has emphasised that there are significant difference in predictability between expert fields with respect to task characteristics, the availability of decision aids and access to feedback. He distinguished between static as opposed to dynamic fields. Engineering is an example of the former and teaching of the latter. Nurses are characterised by handling static as well as dynamic tasks (fractionated expertise). In *Academic tribes and territory* Becher and Trowler (2001, p. 23) claim, “the ways in which particular groups and academics organize their professional lives are related in important ways to the intellectual task on which they are engaged”.

Furthermore, “academic cultures and disciplinary epistemologies are inseparably intertwined.” They distinguish between pure science, applied science, social science, humanities and humanity-related professions (e.g. law). What characterises a professional knowledge base, however, is that it is heterogeneous, build up with diverse disciplines as components. Yet, each profession has its own, unique structure of disciplinary fields where some disciplines are more fundamental than others.

Stark (1998) compares diversities across professional fields and identifies the following typology of professional fields based on what they address: human client examples (e.g. nursing, social work), information fields (e.g. education, library sciences, journalism), enterprise fields (e.g. business, engineering), and artistic fields (e.g. music, art, drama). Then, fields are different in terms of the service and technical roles of the professions, their connections and linkages (e.g. work context, research basis, public control), value systems, inquiry method and symbol system. The latter dimension includes Becher and Towler’s (2001) hard – soft dimension, and we would add also Shanteau’s (1992) distinction between static and dynamic domains. She argues, however, that other dimensions also are of significant importance to understand the characteristics of professional field.

In Stark’s (1998) typology, nursing, engineering and teaching fall in three diverse professional fields. She developed five components along which professional fields diverge:

- Services or technical role, including problems dealt with, “service” to society and technical and conceptual competences required.
- Connections and linkages, including links to foundational disciplines, practical communities and other professional fields, and the integration of disciplinary or knowledge components of the professional knowledge base.
- Values, including attitudes about the service role, clients and improvement of the field itself.
- Methods and inquiry, including problem solving strategies, the unique method of the field and inquiry methods of its foundational disciplines.
- Symbolic and discourse communities, including technical and non-technical symbol system used within the community of practice and in communication with clients and the public.

She summarises the human client field, which includes nursing, as “...altruistic, regulated by the public, and practiced in limited settings. They have strong connections with both practitioners and foundation disciplines and place strong emphasis on [...] socialization in professional norms and values. The mode of inquiry is practical and eclectic, and the symbol system is open and closed for different audiences” (pp. 372–373). The enterprise field, which includes engineering, Stark describes as diverse, but mainly concerned with production of products or services. They have strong connections with structured disciplines such as science and mathematics. Socialisation is not highly valued and there is limited emphasis on ethics. Valued socialisation may be in modes of thinking, problem solving, and creating. Symbol systems tend to be more closed than open (p. 378). The information fields, which includes teaching, professional practice is oriented toward people and data. There is

no strong consensus about roles and values, and the connections with foundation disciplines are generally loose. The modes of inquiry are practical and eclectic. Teachers have a symbol system that is open to the public (p. 375).

The differences between professional fields might enlighten the analysis of professional development and learning and direct policies, practices and research on professional learning. Interventions “can be designed to take account of the specific characteristics of the [professional field], rather than expect all programs to fit the same mould.

34.5 Concluding Remarks

We started out by focusing on overall developments in work life generally. Non-routine mental work, problem solving and complex communication with colleagues, other professions and “clients” is increasing. There is a drift towards professionalization within professions and new professions develop. New developments in learning research – in particular, the interest in learning at work challenges – challenges policy and practices in both professional education and continuing professional education. The change of focus from teaching to learning that took place in the 1990s in higher education (at least in the rhetoric on teaching and learning in higher education) has transferred to the professional development field. Yet, the change of focus took a somewhat different direction, from learning in the work context as alternative to off-site and upgrading of work practice as the core activity from which learning emerges. It also means a focus on non-formal learning, learning implicit in work and reactive learning close to work.

Professional learning is multi-layered. At one level, it refers predominantly to transformations at the level of individuals, their competence, learning, professional career and lifelong learning even beyond their professional lives. There is also a level of social interaction. Professionals usually do not work in isolation; they belong to professional communities and often work in teams. To improve the achievement of on teacher, nurse or engineers the work environment they are working within needs to be taken into consideration. This is one of the key points made by Timperley (2011) in her analysis of professional development in schools. Eraut (2007) particularly emphasise the impact that working alongside others have on professional learning. From an activity theory perspective Engeström and Sannino (2010) define the collective level as the very subject of learning, which affords an analysis of how individual action, collegial interaction and commitment is embedded in institutional structures and processes. This latter point takes the framing of professional learning and development to yet another level; the workplace, for instance a school, a hospital or an engineering firm. Professional learning among individuals and collegial professional collaboration might imply changes at an institution level, for instance, organisation of work processes, relationships between professionals, teams and management. The multi-layered character of professional learning and development becomes even more recognisable at this institutional level because institutions are

constituted within a system of societal division of labour. Institutions relate to other institutions, to individual, to a societal field and to the public. Professions are part of a social order, and this also counts for the professionals as individuals and communities.

Professionalism refers to a system that cuts across workplaces, firms or institutions. The foundations of professions are higher education, research-based knowledge, shared value systems and agentive approach. A profession is an association, at one level also an organisation. A comprehensive approach to professional learning and development needs to include these complex relationships, for instance, the interface between profession and professional education, science and research and professional practice and the interface between professionals and the public. Research on professional development in and across professions, workplace learning and practice-based learning generally form a ground for reframing professional development policy, practice and research. The move beyond professional development programs to professional learning that many researchers have emphasised (e.g. Webster-Wright 2009; Timperley 2011; Dall'Alba and Sandberg 2006; Boroko 2004; Hodkinson and Hodkinson 2005; Boud and Hager 2012) is well grounded in research on learning. It also implies underscoring the initial nature of professional education, its certifying character that make the ground for continuing professional learning and development (Lave and Wenger 1991). However, this move also opens an array of new challenges: reframing learning situated in work processes, collegial interaction, institutional structures (including power structures), interprofessional collaboration and external relationship to the public (widely speaking).

In sum, across this chapter we have taken yet another step by including insights from sociology of professions: emphasising also the need to conceptualise professionalism and professions, the nature of professional knowledge and expertise, the strengths and limits of professional education, and the social role and responsibility inherent in being a professional. Emphasising learning in the workplace is a needed, but not sufficient, move in research on professional learning and development. The notion of professional epistemic cultures (Knorr Cetina 1999, 2006) also emphasises the nature of professional knowledge and professional communities (see also Wenger 1998), which, in the perspective of professional development, underscores the need to include also insights from within the professions and change processes in both local institutional practices and the development of professions and professional knowledge and knowledge cultures. Professional development policy, practice and research are, by its nature, a truly interdisciplinary enterprise.

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Chapter 35

The Real Professional is a Learning Professional

P. Robert-Jan Simons and Manon C.P. Ruijters

Abstract ‘Professions’ were called “learned professions in ancient times.” Since then professions and professionals have played a continuing, but constantly changing role, in our organizations and society. Despite the amount of vagueness and ambiguities, the concept of ‘professional’ remains popular. It has been used as a standard, a demand, a defense and as an attack. It is also a concept with many definitions and many connotations and denotations formed by history and social contexts. Many authors have even suggested abandoning the notion of professional as a conceptual tool. We think that it is time to give this concept new clarity, use, and interpretation, fitting better within our time and, most of all, providing value to our work systems. In this chapter, we harvested what history has taught us in order to find a different mindset, to further define and contemplate the professional. Our main tenet is that professionalism is a self-chosen characteristic that is closely related to learning. From the literature, we derived eight characteristics of professionals and connected these to learning. The question of who is and is not a professional has fundamentally changed, going from learned professions to learning professionals. Finally, we present a model of different ways of learning that learning professionals need, both individually and collectively. The chapter ends with implications for theory, research and practice.

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Keywords Professional • Learning and development • Learning landscape • Commitment • Integrity • Body of knowledge • Theory of practice • Island of expertise • Professional frame • Autonomy • Authority

Concepts such as professional, professionalism, professional development and professionalization play important roles in our organizations and societies. These roles are more important than we tend to think at first consideration. And these, "... notions of 'profession' and the 'professional,' as they are used in society generally, are slippery and ambiguous ones that can create unfortunate confusions..." (Watson 2003, p. 94). With this sentence, Watson characterized the core of an issue which, in current theory and practice, has more impact than to be expected of a concept. Despite the amount of vagueness and ambiguities, the concept of a 'professional' remains popular. It is used as a standard ('I think this is unprofessional'), as a demand ('You should handle this professionally'), as a defense ('as I am a professional, I have a right to a certain amount of space, unpredictability, autonomy') and as an attack ('they don't accept management'). It is also a concept with many definitions (Evans 2008; Friedson 1986, 1989; Schinkel and Noordegraaf 2011) and many connotations and denotations formed by history and social contexts.

'Professions' were already known in antiquity (e.g., divinity, medicine, and law). They were called 'learned professions' (Perks 1993). Since then, professions and professionals have played a continuing, but constantly changing role, in our organizations and society. Due to the vagueness of the concept, more than once, it has been suggested to abandon the notion of profession as a conceptual tool (Bourdieu and Wacquant 1992; Watson 2003). However, practice and history have shown a different outcome, possibly due to the longing for "good work" which forms the starting point and core of professionalism. As Schinkel and Noordegraaf (2011) stated, "Professionalism refers to the occupational behaviors and practices of workers who not only have full-time jobs but also possess a clear sense of what their work is about and when it is effective. Some sort of collective – traditionally called a "profession" – guards and maintains this self-awareness" (p. 68).

As such, it is time to give this concept a new clarity, use, and interpretation, fitting our time and most of all, providing value to our work systems. By this view, the question of who is and is not a professional has fundamentally changed from how to stay a professional to how to move from learned professions to learning professionals.

In this chapter, we harvested what history has taught us and explored the denotations and connotations of professionalism. We then confronted these findings with the current main discourse. On what issues do different scientists agree? Which key points can be deducted in order to find a contemporary view of professionals? In the second part of this chapter, we then elaborated on the implications of this new view for professionals and organizations. Our main tenet is that professionalism is a self-chosen characteristic that is closely related to learning. Lastly, we expanded the ways of learning that learning professionals need, using a model of islands, bridges and polders, as developed previously.

35.1 Analysis of Denotations and Connotations

What has history taught us (Crook 2008; Evans 2008; Friedson 1986; Schwab 1965) about concepts of profession and professional? We give an overview of the different connotations of the concept of profession in sequence and explore the (apparent) contradictions. Most of these stem from the work of Friedson (1986, 1989, 2001), with the addition of other reviews or position papers (such as Evetts 2003; Gardner and Shulman 2005; Larson 1978; Schinkel and Noordegraaf 2011).

35.1.1 *Positive or Negative Connotations*

The concept of profession finds its oldest English denotation before the sixteenth century. To profess then referred to a declaration, an expression of purpose. The concept was used in clerical foundations of the medieval university, and had in its origin a positive sound, “He professes a certain point of view.” The same word, however, was also used in the meaning of, “He professes to know nothing about it.” Although ‘profession’ seems a neutral concept nowadays, the related concept of professional is still subject to admiration as well as ridicule (Gardner and Shulman 2005; Larson 1978).

35.1.2 *Exclusive or Inclusive*

A profession was for a long time a name earmarked for a specific set of university-schooled occupations: divinity, law, medicine (although not for surgery). All of these were occupations for the well-born. As a consequence, these professions found high regard. This regard was not due to the profession in of itself, but to the people practicing it. During the same period, the general use of the word as a synonym for occupation emerged (Wilensky 1964). Since then, there has been fast growth of professions and a growing dispute on the issue of what is and what is not a profession. Many laypersons agree teachers and nurses are professionals, but are in disagreement about the professionalism of politicians or artists. And what about managers (Gardner and Shulman 2005; Watson 1913)?

35.1.3 *Sophisticated or Ordinary*

Somewhat later in history, the word was used to distinguish a professional from an amateur. It is important to realize that being an amateur started as something favorable: being able to do something simply for the fun of it, not depending on it for living. Professionals in contrast, are working for their money. Even though they are

working for the higher good, this was seen as very ‘ungentlemanly.’ The Oxford Dictionary of 1971 wrote, “disparagingly applied to one who makes a trade of anything that is properly pursued for higher motives” (pp. 2316–17).

35.1.4 High or Low Quality

The contrast between a professional and an amateur makes the dedication and motivation of the professional suspect. However, what makes professionals respected is the quality they deliver. In this regard, the distinction between an “amateurish job” and a “professional job” is illustrative. As such, the quality of a professional is worth paying for. This difference in interpretation led again to a wide use of the term profession. Larson (1978) has written extensively on this issue and the consequences it brought:

The conditions of professional work have changed so that the predominant pattern is no longer that of the free practitioner in a market of services, but that of the salaried specialist in a large organization. In this age of corporate capitalism, the model of profession nevertheless retains its vigor; it is still something to be defended or something to be obtained by occupations in a different historical context, in radically different work settings, and in radically altered forms of practice (p. 18).

35.1.5 Title or Sobriquet

In the beginning of the nineteenth century, the connotation of the word professional had been turned up-side-down so many times (for example it was also used as: ‘a professional partygoer’) that researchers did not want to be known as professionals anymore. The John Hopkins University for example, described their mission as, provides advanced instruction, not professional, to properly qualified students in various departments. Evetts (2003) described the tension between vilification on the one hand and adulation on the other hand very clearly. In the end, the scales tip in the positive direction because of the growing importance attached to knowledge.

35.1.6 Highly or Less Highly Educated

In more recent years, the word professional has mostly been used for people educated in a specific kind of organized and institutionalized knowledge, both in a theoretical and a scientific sense. It has to be more than mechanical knowledge. A dentist has also been incorporated in this connotation, probably because this profession is not only manual, but has a scientific basis. The debates in this period deliberate about the level of education needed to be called a professional. In recent descriptions, as in Webster, you find that education on a specialized institute is

sufficient and higher education is no longer a prerequisite. The emphasis is placed on professionals being knowledge workers, people for whom the ‘production of knowledge’ is more important than the ability to carry out physical labor (Weggeman 2007). “It refers to more than dignity, prestige and status and the possession of formal knowledge, implying a process of social control of professional behavior as well as institutions by which the process is carried out” (Friedson 1986, p. 26).

35.1.7 Power or Servitude

Much discussion is given to the aspect of power. As Friedson (1989) wrote, “Professional control over work, requires some control over clients. It presupposes that the professional, not the client or the employer, determines at least a good part of what work is to be done and how it is to be done” (p. 218). But Illich (in Van Houten 2008) took an opposite position, stating that professionals only want power and are making clients dependent and disabled. Schinkel and Noordegraaf (2011) argued that “power is an outcome of a struggle over control, linked to more encompassing and changing occupational contexts” (p. 70).

35.1.8 Autonomous or Restricted

In part, influenced by the thinking stated in the previous section, a question has recently appeared that concerns the autonomy of the professional in an organized context. Is (s)he self-governing or is (s)he only following orders and reacting to managers (Tonkens 2003)? This issue is strongly related to a wish for quality control. Management pushes towards standardization in order to ‘know’ that quality is guaranteed, but by doing so, by pushing every professional onto one specific road, only the obstacles of that road are subject to improvement. The potential of learning experiences in general is pauperized and innovation, improvement, and growth necessary for a society with increasing complexity, pluralism and unpredictability is diminished (Horstman and Houtepen 2008; Van Gunsteren 1994).

Schinkel and Noordegraaf (2011) made a distinction between internal and external “professional control,” stating that the core of a profession is internally organizing the quality and externally shielding professional practices from external influences.

35.1.9 Learning from History

The historical overview underlines the amount of connotations and denotations that apply to the concepts of professions and professionals. It also makes clear that it is a concept sensitive to history, context and society. “Professionalism can be seen as

a social construction, it acquires (new) forms and shapes in changing economies and labor organizations,” as Schinkel and Noordegraaf (2011, p. 83) stated.

The question that arises is to what connotation fits our own timeframe? We will come back to this later. The meanings that arose over the course of time, did not all retain their power and relevance. Some of these help us, however, to make the thinking behind it explicit. Thereby we prefer to preserve the positive connotations of the concept of professionalism and to do justice to it. This means choosing quality and integrity. Let us go back to some of the meanings.

What about the exclusiveness issue? In our view there is not a necessity to exclude some of the vocations. We do not believe it is fruitful to discuss which vocations belong to professions and which ones do not. Instead, we believe that anybody is free to become a professional and to develop (individually or collectively) along the insights stemming from the concepts of professionalism. We see being a professional as a way to do your job.

How relevant is education and training? In our view, it is the link with abstract knowledge that is especially basic to being a professional. The added value of a professional is the ability to make a translation from theory to application, being a bridge between science and practice. Knowledge tends, however, to become outdated in rapid tempo. Thus, it is thus not the education that is relevant, but the availability of and access to knowledge. An active orientation to let the scientific world be a part of your network is, in our view, an important condition.

How is the state of affairs as to autonomy and authority? As Sennett (2008) wrote sharply, “The master has autonomy and authority” (p. 71). Both are a consequence of solid craftsmanship. Nobody will claim to be as able as the “master” when building a Stradivarius, yet, more professions are losing their “authority,” simply because the client system has become owners of the knowledge as well. This means that professionals should work harder to ensure their authority. The development of one’s own expertise is part of this authority. We revisit this later. The next section presents an overview of the traits of modern professionals as it appears in the literature.

35.2 Traits of the Modern Professional

The literature provides diversity as well as a fair amount of agreement between researchers on what is and what is not a professional. The second step we made was an analysis of definitions, or to be more precise, an analysis of traits.

We collected the definitions and chose the work of Gardner and Shulman (2005) as our reference point. We did so because their work shows the best link between learning and development, which fits our purposes of drawing a sketch of the learning professional. Then, we compared other attributes described in the literature with the work of Gardner and Shulman to look for confirmation or gaps and additions. Here, we present the results of the comparison and elaborate on them. Table 35.1 presents a summary.

Table 35.1 Different trait-theories compared

Gardner and Shulman (2005) characteristics of a professional	Also mentioned by
A commitment to serve in the interests of clients, in particular, and the welfare of society, in general	Barber (1963): Orientation to community interest, rather than self-interest Bayles (1988): In a position to provide an important service to society Friedson (1989) and Larson (1978): Orientation to services and their ethics Greenwood (1957) and Lubell (1978): Community sanction Kubr (2002): Service and public interest Millerson (1964) and Runté (1995): Altruistic service Schinkel and Noordegraaf (2011) A higher calling Weggeman (2007): Passionate
The developed capacity to render judgments with integrity under conditions of both technical and ethical uncertainty	Barber (1963): A high degree of self-control through codes of ethics, internalized via work socialization Greenwood (1957) and Lubell (1978): Ethical codes Kubr (2002): Ethical standards Millerson (1964): Compliance with a code of conduct professional standards Runté (1995): Adherence to a code of conduct Weggeman (2007): Has a strong professional ethics and adheres to
A body of theory or special knowledge with its own principles of growth and reorganization	Barber (1963): A high degree of generalized and systematic knowledge Bayles (1988): Significant intellectual component Friedson (1989) and Larson (1978): A cognitive dimension that is about the body of knowledge Greenwood (1957) and Lubell (1978): Systematic theory Kubr (2002): Knowledge and skills Millerson (1964): Skill based on abstract knowledge Runté (1995): Skill based on abstract knowledge Schinkel and Noordegraaf (2011): Knowledge and skills Weggeman (2007): In the possession of specialized knowledge
A specialized set of professional skills, practices, and performances unique to the profession	Kubr (2002): Knowledge and skills Millerson (1964): Skill based on abstract knowledge Runté (1995): Certification based on competency testing Schinkel and Noordegraaf (2011): Own activities as part of an occupation and a profession defines successful practices

(continued)

Table 35.1 (continued)

Gardner and Shulman (2005) characteristics of a professional	Also mentioned by
An organized approach to learning from experience both individually and collectively and, thus, of growing new knowledge from the contexts of practice	<p>Bayles (1988): Extensive training</p> <p>Kubr (2002): Self-discipline and self-regulation (the profession organizes itself in membership organizations that develop the profession)</p> <p>Millerson (1964) and Runté (1995): Provision for training and education, usually associated with a university</p> <p>Schinkel and Noordegraaf (2011): A professional does not merely work; he/she has to be educated and trained, (socialized) as member of an occupational domain, supervised by his/her peers and held accountable</p>
And the development of a professional community responsible for the oversight and monitoring of quality in both practice and professional education	<p>Barber (1963): A high degree of self-control through codes of ethics, internalized via work socialization</p> <p>Friedson (1989) and Larson (1978): The social dimension which is about forming community on shared interests and commitment</p> <p>Greenwood (1957) and Lubell (1978): A culture</p> <p>Kubr (2002): Self-discipline and self-regulation (the profession organizes itself in membership organizations that develop the profession)</p> <p>Millerson (1964) and Runté (1995): Formal organization</p> <p>Schinkel and Noordegraaf (2011): Organized and regulated by a collective</p>
Not mentioned by Gardner and Shulman	<p>Barber (1963): A system of rewards, monetary and honorary that symbolizes work achievement</p> <p>Friedson (1989) and Larson (1978): The evaluative dimension centered on the professions singular characteristics of autonomy and prestige</p> <p>Greenwood (1957): Authority</p> <p>Kubr (2002): Social recognition and enforcement: The society recognizes the social role and status, and the ethical and behavioral standards of the profession, may explicitly set by middle of regulation and demarcation</p> <p>Lubell (1978): Authority – professionals have significant control over the nature and extent of the services that they render, because they serve clients who are generally unable to judge the quality of those services</p> <p>Weggeman (2007): Seeks autonomy</p>

When we follow the characteristics proposed by Gardner and Shulman, a comparison with other authors brings the following insights:

(a) ***A commitment to serve in the interests of clients in particular and the welfare of society in general***

In the first place, being a professional relates to a service orientation, and thus, not to making products. There is a need for people who take care of issues such as justice or health. The exchange a professional makes with society is the commitment to act responsibly, unselfishly, and wise (within the borders of one's own profession). In return, society gives the opportunity to study and to exercise a profession. There is also an ethical perspective included as well as the tension between the interests of individual clients, in particular, and the well-being of society, in general.

This basic notion of a professional appears in the other characterizations of professionals as well, albeit, sometimes using other words. Some formulate an even stronger perspective by choosing an altruistic service orientation (Millerson 1964; Runté 1995) or even more strict like Greenwood (1957) and Lubell (1978) who focused on a form of sanctioning by the community. Some authors such as Barber (1963) were more lenient: orientation towards the interest of the community, instead of self-interest. Some other authors (Schinkel and Noordegraaf 2011; Weggeman 2007) chose an almost spiritual perspective by considering avocation or passion. It strikes us that this examination of which scientists are in agreement, is often not discussed in practice. This point raises some automatic questions about professions in large organizations where this service orientation may mean organizational commitment. How often does the interest of individual clients conflict with the direction the organization has chosen?

(b) ***The developed capacity to render judgments with integrity under conditions of both technical and ethical uncertainty.***

This characteristic is a direct consequence of the service orientation. It is true that all professionals have a series of standard actions, but they all have to deal with a great number of unpredictable situations. The service delivered is not purely dependent on the profession. Each situation is different and again, not only technical, but also pragmatic and ethical considerations play a role. In dealing with these contexts exactly, lays the integrity of the professional to make ethical decisions. Here, we also see the differences between a professional and a craftsman. Both have a technical component that is characterized by a continuous wish to improve (Sennett 2008). The dilemmas that a professional encounters are, however, different from that of the craftsman. Where a craftsman, for instance, chooses between beauty and functionality, the professional may be considering the balance between technical, ethical and pragmatical issues.

The most striking difference between Gardner and Shulman and the other authors is their emphasis on learning processes in contrast to predetermined norms in a code of conduct. Only Barber (1963) formed an exception by speaking of a high amount of self-control that is facilitated by a code of ethics which is

internalized by the socialization process of the work itself. Gardner and Shulman wrote that the work goes beyond the repertoire that was originally learned. The more the dynamics and complexity of the world increases, the more there is pressure to make ethical decisions, and thus, additional requirements for the learning processes that accompany these.

(c) *A body of theory or special knowledge with its own principles of growth and reorganization.*

Although it was not the first element in Gardner's and Shulmans' overview, one trait, which has often disappeared in the many disputes of who is and who is not a professional, came forward as a stable core component: the possession of formal knowledge. In our view, this characteristic of the professional should also include the ability to translate this to practice. Although Schön (1983) had a broader perspective on 'theory,' he also saw the connection between theory and practice as the main quality of a professional. Within all of the discussions and differences of opinion, this element underpins most of the views on professionals and professionalism. It was part of the structural functionalism of Parsons (1954), the power-oriented approach of Illich (1971) and the attribution approach of Friedson (van Houten 2008). Friedson (1989) deepened this insight of the role of knowledge. He made a clear distinction between the knowledge that influences practice, and the knowledge that scientists present. We tend to forget that these, as he expressed it, are different types of knowledge. "By definition, formal knowledge is not part of everyday knowledge. Knowledge must have agents or carriers" (Friedson 1989, p. 9). In history, these carriers have had different names, being: 'intelligentsia' (Poland and Russia, 1860s), 'intellectual' (Western European and North American), 'experts' and also 'professionals.' It is this characteristic, being the translator between theory and practice, which is probably the core characteristic of a professional.

Here too, our practical experience gives us an indefinable feeling. As stable as this characteristic appears in the theories, so it is absent in practice. Formal knowledge is often maligned and professionals demand that knowledge should be applicable immediately. One can hear professional practitioners say comments such as: "I do not like books. This article is too abstract. This approach is too scientific. It should be usable tomorrow." Some professionals make these comments without any hesitation.

Taking this principle seriously also means that the professional is aware of the fact that (s)he is the translator of theory and research and that formal knowledge should not be avoided but instead, be actively sought when one wants to be an effective professional. We propose to let the ability and willingness to translate theory into practice be the core of this trait. In comparison with the other authors, Gardner and Shulman proposed the addition; "with its own principles of growth and reorganization" (p. 14). As such, this characteristic is more contemporary. We propose to reformulate this characteristic into, "willingness and ability to translate a body of theory or special knowledge with its own principles of growth and reorganization into practice."

- (d) ***A specialized set of professional skills, practices, and performances unique to the profession.***

According to Gardner and Shulman, technical skills such as skills related to analyzing, argumenting, treatment, rites, diagnosis, action and interaction are very distinctive for professionals. They made this a separate characteristic, whereas other authors (Kubr 2002; Millerson 1964) tended to combine this with the previous characteristic (body of theory or special knowledge). Schinkel and Noordegraaf (2011) focused on one's own activities that define a successful practice. We agree with these last mentioned authors and with Gardner and Shulman that these skills, practices and performances merit a separate place, because these stem from learning in practice and not from theory.

- (e) ***An organized approach to learning from experience both individually and collectively and, thus, of growing new knowledge from the contexts of practice.***

This fifth point was originally formulated as the continuous necessity to learn from experience in order to become smarter, wiser and more skilled. However, Gardner and Shulman discovered that no professional can do this alone. They need each other to grow into the profession and to add new insights. Most of the other authors confined this point to formal training (Bayles 1988; Millerson 1964; Runté 1995). Kubr (2002) added self-discipline and self-regulation and Schinkel and Noordegraaf (2011) also took a broader interpretation: a professional does not merely work; he/she has to be educated and trained, (socialized) as member of an occupational domain, supervised by his/her peers and held accountable. The unique contribution of Gardner and Shulman, which also appeared in their previous points, was their awareness that both the individual professional and the profession itself should develop and continue to develop. The core of this point is that professionals and professions should develop and keep on developing continuously.

- (f) ***The development of a professional community responsible for the oversight and monitoring of quality in both practice and professional education.***

The sixth and final point described by Gardner and Shulman also finds broad support in the literature. Millerson (1964) and Runté (1995) focused on the importance of the formal organization. Friedson (1989) and Larson (1978) mentioned the social dimension about forming a community on shared interests and commitment. Greenwood (1957) and Lubell (1978) mention the importance of a culture. Barber (1963) stressed the importance of a high degree of self-control through a code of ethics, internalized via work socialization. Kubr (2002) formulated this in terms of self-discipline and self-regulation (the profession organizes itself in membership organizations that develop the profession). Schinkel and Noordegraaf (2011) wrote that professionals should be organized and regulated by a collective. When we carefully look at the previous five points described by Gardner and Shulman, it is clear that all of the other points refer to collectivity as well. The most clear and explicit example is in characteristic five (i.e., the necessity for the profession to keep developing). In the other points, collectivity emerges in Gardner's and Shulman's description.

Although the professional community is a recognizable and central focal point where all developments, ideas and mores come together, an important question remains whether this is a characteristic of a professional or an automatic consequence of professionalization. In our view, the core of these communities is in the processes of learning and development where professionals need each other for their own reflection, as well as for the development of the profession.

(g) ***The role of autonomy and authority***

After comparing the six traits as proposed by Gardner and Shulman, there remains a striking set of characteristics that is absent in their article. These appeared not only in the other articles that we studied but also in our historical overview as well as in the discourse we see in practice. Autonomy and authority are the keywords that we will use for these characteristics. We propose to add these to the six points of Gardner and Shulman. The characteristic related to autonomy we formulate as follows. The professional has an orientation towards active shaping of one's own professionalism. Professionals choose to be professionals and thereby, to be self-directed and autonomous (as a result not as a demand). The authority perspective, we would like to formulate as: professionals have an orientation towards active shaping of the profession and of educating fellow-professionals and newcomers.

An important question, however, is whether autonomy and authority are really characteristics of professionals or more consequences of *professionalism*. Autonomy can be seen as closely related to commitment and it arises when professionals have a high quality of professional work execution (Ryan and Deci 2012). Authority arises by executing the profession with a high level of knowledge and quality. Autonomy and authority, so we conclude are more benefits of being a professional than characteristics.

In institutionalized settings where professionals work in larger organizations, the issues of authority and autonomy arise in different ways. In the interplay between managers and professionals, underlying norms and values related to autonomy and authority require attention. Perhaps the interplay is about ownership, but in practice, arguments of quality tend to dominate. Professionals *feel confined* because managers and policymakers want to ensure quality that in the professionals' thinking can only be reached through determining the path to quality (e.g., through standard procedures).

Political philosopher Van Gunsteren (1994) cast a revealing light on this dilemma by highlighting that by following the same path (control), the only progression you make is within that pathway. If practice is organized by one standard, the potential of learning experiences will be greatly impoverished (Horstman and Houtepen 2008). Thus, in a world as ours, characterized by complexity, unpredictability, pluralism, we need to nourish different paths, competencies, and learning experiences. Will this freedom then bring the necessary quality? No, we do not believe so. However, it may lead to another type of quality. In the end, we believe that it is better to stop thinking that freedom or control will lead to quality improvement. The discourse about quality (and ownership) is part of professional functioning, in which organizational, societal, professional and individual interests have to be weighed.

35.3 Where Does This Bring Us?

In search of a modern set of characteristics of a professional, we found in the literature, and especially in the work of Gardner and Shulman, a set of eight meanings and traits. In the current section, we formulate our resulting set of principles. First, it is important to notice that the nature of the characteristics/principles is rather diverse. Some refer more to conditions of consequences than characteristics. Therefore, we distinguish requirements, qualities and benefits. Collectivity is both a separate characteristic, and appears in the other characteristics as well. Some descriptions of Gardner and Shulman have to be reformulated, others remain intact. Two additions also seemed necessary. Table 35.2 presents the resulting descriptions of self-determined learning professionals as well as key points and the original formulations of Gardner and Shulman.

What results is a core of four qualities that each have an individual and a collective side: (a) having and maintaining a body of knowledge, (b) having theories of action with which the professional deals reflectively, (c) disposing an own field of expertise with which one can enrich professional colleagues, and (d) belonging to one or more professional communities. These qualities become only relevant when there is: (e) commitment to services to clients/society, and (f) an orientation to act with integrity in settings where technical, pragmatical and ethical approaches conflict. Finally, a good execution of the profession will lead to autonomy and authority. These strengthen the professional in their possibilities, but cannot be seen as conditions or qualities. Figure 35.1 illustrates this.

What has happened presently within a complex world, using the concept of professional in a mostly classical and diffused way, is only leading to a battered

Table 35.2 Characteristics of the professional reorganized and redefined

	Characteristics of the professional according to Gardner and Shulman (2005)	Key points	Characteristics of “self-determined learning professionals”
Requirements	A commitment to serve in the interests of clients in particular and the welfare of society in general	Commitment	Have a commitment to serve in the interest of clients and society, and by extension have a commitment to take their own learning and development seriously
	The developed capacity to render judgments with integrity under conditions of both technical and ethical uncertainty	Integrity	Have the will and ability to handle ‘not-knowing’ and the unexpected with integrity, and by implication are oriented towards reflecting on these experiences

(continued)

Table 35.2 (continued)

	Characteristics of the professional according to Gardner and Shulman (2005)	Key points	Characteristics of “self-determined learning professionals”
Qualities	A body of theory or special knowledge with its own principles of growth and reorganization	Body of knowledge	Have abstract knowledge (body of knowledge), are willing and able to translate that into practice and are in connection with new developments in science
	A specialized set of professional skills, practices, and performances unique to the profession	Theory of action	Have a specialized set of professional skills and ‘theories of action’ and have the willingness and ability to be reflective practitioners
	An organized approach to learning from experience both individually and collectively and, thus, of growing new knowledge from the contexts of practice	Field of expertise	Have their own ‘field of expertise’ and have the desire to play a role in learning from experience both individually and collectively and, thus, of developing practice and fellow practitioners
	And the development of a professional community responsible for the oversight and monitoring of quality in both practice and professional education	Professional community	Belong to one or more professional communities, has an orientation to work collectively and trans disciplinary in order to cope with complexity
Benefits		Autonomy	Has an orientation towards active shaping of his or her own professionalism; he or she chooses to be a professional and thereby chooses to be self-directed and autonomous (as a result, not as a demand)
		Authority	Has an orientation towards active shaping of the profession and of educating fellow-professionals and newcomers

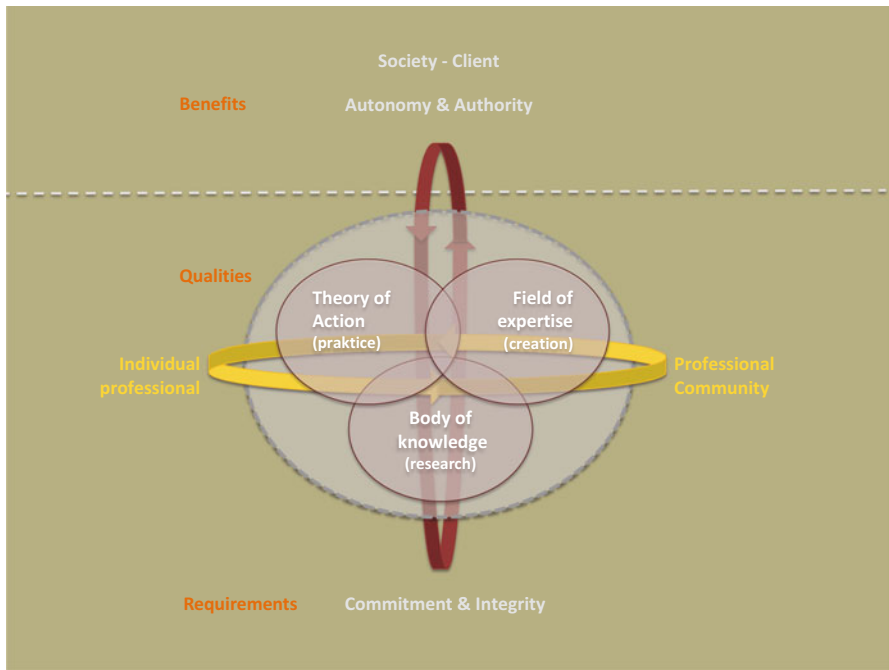


Fig. 35.1 Schematic overview of the different traits of a professional

professional, who has forgotten how to defend his profession. Organizations (or is it society) react to this by adding control. Professionals react by defending their professional space. In this battle, the connection between theory and practice becomes more diffused.

Instead of control or professional space, we have to place attention on the connection between theory and practice, and to the fact that being a professional is a choice; a choice, which brings forth responsibilities (e.g. to stay connected to theory) and powers (e.g. to be autonomous).

Choosing to be a professional entails:

- Doing the best for clients and society,
- Acting in integer ways in uncertain and complex situations,
- Actively connecting with the newest insights in theories,
- Daring to look critically and reflectively towards one's own practice, and
- Contributing to the development of the profession and fellow professionals.

This choice requires an interplay with fellow professionals and brings, if executed well, autonomy and authority. As the word professional comes from the Latin *profiteri*, which means openly declared (Wanrooy 2001), the real question is: who wants to openly declare they are a professional? The answer to this question also includes the commitment to actively organize one's professionalism, to learn and

develop, both individually and collectively, in formal education, training and at work. Setting this question as the foundation, the traits we derived from history and theory become more contained and meaningful. As a consequence, those who choose to be a professional fit Maister's (2006) remark, "believing passionately in what you do, never compromising your standards and values, and caring about your clients, your people, and your own career". Those professionals will make high demands of themselves, improve their own performance and strive to provide the best possible service to their clients (Maister 2006).

35.4 From Professional to Learning Professional

Thus, we start defining a professional by saying that it is a choice and involves responsibilities, capacities and gains. The question no longer is: who is a professional, but who chooses to be a professional. And by consequence if you choose to be a professional – how do you shape your professional development in order to remain a professional. Bodies of knowledge as well as the standards of work quality and contexts change so rapidly, that nobody can earn the 'title' of professional by studying hard and keep it forever. The title continuously has to be re-earned by a way of practicing and learning. For these reasons it is of the utmost importance to integrate learning and development into the traits of a professional. It is not (only) a matter of gaining a body of knowledge, but of maintaining a body of knowledge; not (only) of having a theory of practice, but of keeping it accurate. Thus, the next question is what types of learning are necessary in being a learning professional? Let us start by going back to the traits and make a first derivate (see Table 35.3).

35.4.1 *Three Ways to Learn*

There are three basic ways of professional learning that are close to the key task of professional work (as described above): learning through practicing, inquiring and creating (see Table 35.3). Ruijters and Simons (2006) analyzed and described these three basic ways of learning extensively in their metaphor "Islands of learning." First, we summarize the meanings of these three ways of learning. The next sections discuss them in more detail. Subsequently, we will introduce the other parts of our metaphor: bridges and polders (see Fig. 35.2).

Practicing is all learning that is taking place (most of the time) automatically in the context of working, problem solving and living. It is learning as a side effect of other activities that is mostly not pre-organized, pre-planned or pre-structured. Its outcomes are experiential knowledge and skills. Inquiring is all learning that leads to new (mostly explicit) knowledge and skills. It includes doing or being involved in research, as well as activities such as reading books and journals, going to conferences, executing practical or applied research, having discussions, comparing ways

Table 35.3 Characterizations of learning processes of “self-determined learning professionals”

	Key points	Characteristics of “self-determined learning professionals”	Underlying learning process
Requirements	Commitment	Have a commitment to serve in the interest of clients and society, and by extension have a commitment to take their own learning and development seriously	Meta-learning and reflection on research, practice and creation
	Integrity	Have the will and ability to handle ‘not-knowing’ and the unexpected with integrity, and by implication are oriented towards reflecting on these experiences	
Qualities	Body of knowledge	Have abstract knowledge (body of knowledge), are willing and able to translate that into practice and are in connection with new developments in science	Learning through research
	Theory of action	Have a specialized set of professional skills and ‘theories of action’ and have the willingness and ability to be reflective practitioners	Learning through practice
	Field of expertise	Have their own ‘field of expertise’ and have the desire to play a role in learning from experience both individually and collectively and, thus, of developing practice and fellow practitioners	Learning through creation
	Professional frame	Belong to one or more professional communities; has an orientation to work collectively and trans disciplinary in order to cope with complexity	Collective learning, co-creation
Benefits	Autonomy	Have an orientation towards active shaping of their own professionalism; they choose to be a professional, and thereby choose to be self-directed and autonomous (as a result, not as a demand)	Meta-learning and reflection on research, practice and creation
	Authority	Have an orientation towards active shaping the profession and educating fellow-professionals and newcomers	

of working, and visiting another organization, etc. Creating refers to learning that is taking place in the context of the development of new tools, products, publications or services. These various ways of creating lead to design knowledge. It is when one tries to develop or design something that one discovers what one knows and especially, what one does not know.

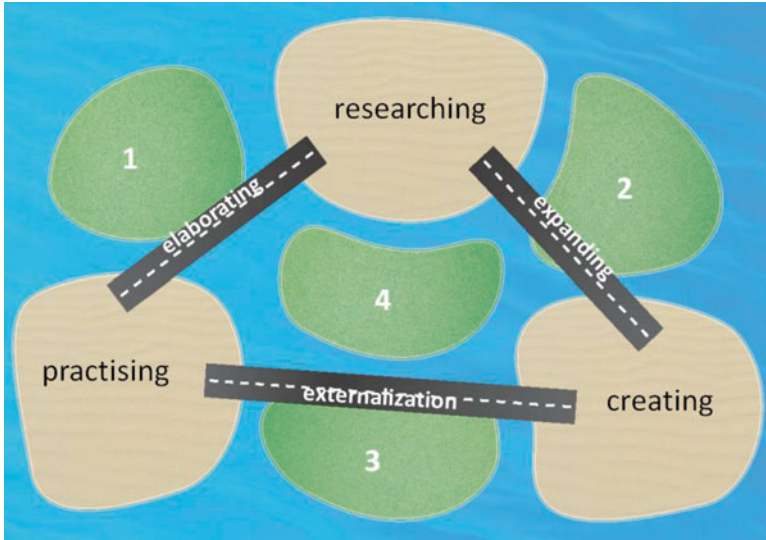


Fig. 35.2 Islands of learning (Ruijters and Simons 2006)

35.4.2 *Practicing: Learning Experientially*

The island of practice implies learning experientially and implicitly. Who we are as professionals is a hodgepodge of formal education, what we have learned in everyday life, semi-formal experiences as coaching and mentoring, and beliefs and social influences. Formal education gives us our legitimacy, but what we learn, without explicit knowledge, is at least as important in becoming and staying a professional (Leonard and Swap 2005).

The big question is how to build on experiences. In many instances, we think it is better to find ways to help professionals reorganize their work in such a way that the chances of implicit learning grow and increase (Leonard and Swap 2005). This brings us to the following questions: Is it possible to (re)organize workplaces without making learning more explicit and to increase the chances of implicit learning? How can we do that? Based on the studies of Onstenk (1997) and Kwakman (1999), we think this is possible by focusing on six features of work processes and work environments, being: 1. variation, 2. responsibilities, 3. feedback, 4. reflection, 5. innovation/experimentation and 6. vision building.

These six can be organized by managers (e.g., giving time for reflection, organizing feedback, giving autonomy, planning innovation and experimentation, and so on), but they can also be organized by the professionals themselves (e.g., looking for feedback, reserving time for reflection, looking for variation, being open to innovation, etc.).

35.4.3 Inquiring: Learning Through Inquiry

The second important aspect of ‘remaining a professional,’ and acquiring new and necessary knowledge and skills is staying connected to research (our second island). This can take many forms. A professional may read scientific articles, have connections with scientists, may be involved in scientific research or (s)he may do practical research. The degree to which this research resembles scientific research itself varies. It can be an unsystematic attempt to try out new ways of working as well as semi-scientific comparisons between different ways of working. In this perspective, reading articles and books, attending conferences, and discussions as well as formal education are all examples of research (i.e., gaining new knowledge, skills, and insights). One of the most important ways of learning through research for a professional is through explicit self-directed learning. This may involve:

- Formulating learning goals,
- Planning learning activities and strategies,
- Testing learning results,
- Monitoring learning,
- Judging and rewarding learning, and
- Placing learning processes and learning outcomes at the center of attention.

Studies of learning on the job by Doornbos and Krak (2001) and (Eraut 1994) showed that, as compared to the occurrence of implicit learning, only few professionals tend to organize explicit learning themselves. This, probably, has to do with the emotional states related to the occurrence of explicit learning. One needs some confidence before engaging in learning in the first place, and one needs some curiosity in order to be motivated to get involved with explicit learning (even if it concerns on the job learning). When one is learning explicitly, confidence in one’s own, mostly implicit theories and competences will increase. Moreover, learning explicitly can even create increased curiosity: the more one knows, the more one wants to know.

35.4.4 Creating: Learning Through Design

The third island, creation, refers to learning from producing or designing. It has its origins in the wish and necessity to transfer one’s own insights and experiences to colleagues. However, in developing new products, tools, instruments, manuals, policy-plans, guidelines and in teaching others, we also (or mainly) learn ourselves. The need to develop an island of expertise of one’s own (which is part of being a professional), leads to the need to create, which in of itself, results in new insight so that our own field of expertise becomes stronger. Here, we see a need for professionals to connect their learning to concrete and public milestones or deliverables. These milestones can be in the profession (e.g., publications, lectures, workshops, teaching

activities, etc.) or in the workplace, both at the team (e.g., plans for group actions; contributions to team learning) and the organizational level (e.g., contributions to company policies or to organizational learning). Common in these milestones is that they are concrete and related to (learning-) activities of other people. Moreover, these milestones can be made visible and connected to a date and place, for instance, “I will make a checklist for my organization before Christmas and publish this on the company web” or, “I will reformulate our vision and collective ambitions.” Concrete milestones make the outcomes of creation learning visible and easy to share and plan. Milestones can bring the necessary challenge that helps the learner to maintain the motivation to continue and to learn, and to put personal learning outcomes in relation to the learning and working of other people. Professional colleagues and team members can profit from one’s learning and the learner has something to look forward to. The milestone can provide an extra form of reward when reached. It is exciting to see that people use what you have learned and developed. It is rewarding to see that one’s article is accepted for publication in a professional journal, etc. But most of all, it is the learner, who in searching for the right words or explicating the ideas necessary for teaching others or making concrete applications perhaps profits the most in learning from these activities.

Van Veldhuizen (2010) studied learning of vocational teachers in a project, “learning at work, working to learn”. Teachers could choose to attach their learning to specific work goals and projects. They received time to accomplish this and had freedom in choosing their own milestones and work outcomes. The learning trajectories were very successful and led to important learning outcomes. One question was whether these teachers would use the freedom granted or not. These were the results:

- Choice to co-operate or to work alone (11 co-operated versus 4 alone),
- Choice of partner(s) (7 chose their partner versus 5 had assigned partners),
- Choice of assignments (10 chose themselves versus 4 did not),
- Choice of assignments inside or outside own department (11 inside versus 2 outside),
- Making their learning goals explicit for their partner(s) (5 yes versus 9 did not), and
- Engaging in explicit activities that contribute to their learning goals (13 yes versus 2 did not).

Thus, the teachers differed in the extent to which they decided to make use of the freedom offered. The next sections introduce the remaining parts of our metaphor “Islands of learning.”

35.4.5 Connection and Reflection

Practicing, inquiring and creating are the three basic components of the learning-professional model. However, these basic forms of learning are not automatically interconnected. Just like islands in the sea, they tend to be separate. What one learns

in practice is different from what one learns through inquiring or creating. Think for a moment about the difficulties of implementing new ways of working. How often did you hear someone state that it was an interesting lecture, but it did not change his or her practice? Specific learning activities and processes are needed to make connections. One can recognize the ways of learning as being ‘islands.’ Bridges were added to conceptualize the ways of learning that connect islands.

Connecting islands is essential for more than one reason: it brings more focus to someone’s professional development (e.g., searching for new knowledge is the result of the questions raised by practice, instead of encountering an arbitrary input accidentally), it makes experiences explicit so as more possible to share, and by setting some distance to practice, it is possible to see patterns and to make double loops in learning, to name a few.

Bridges form the second components of the model connecting two types of knowledge originating at two islands. The outcomes of one way of learning (i.e., practicing, inquiring or creating) are connected to the other way of learning. The bridge between practicing and inquiring we call elaborating: making implicit knowledge originating from practicing explicit in order to be able to investigate it further and apply explicit knowledge in practice.

The bridge between inquiring and creating we call expanding. This bridge connects new knowledge with possible products, tools or services: what can be developed further on the basis of this knowledge, what is interesting enough, and what are important target groups and markets? It also refers, the other way around, to finding gaps in knowledge that one needs to fill in order to be able to design, develop or publish.

The third bridge is called externalizing and connects new products, services, tools and publications to practice. How can something new be implemented in practice? What new products or tools are needed in practice? Bridges can be crossed from two directions. In our model, these directions have different meanings. We will explain these directions in relation to the first bridge, the bridge of elaboration.

35.5 Elaboration: Becoming Aware of One’s Implicit Learning Outcomes and Processes

There are good reasons for professionals to develop more awareness of implicit learning processes and outcomes. First, when people realize what they have learned implicitly, they develop a sense of pride, and a shift in their mental model: from learning-is-only-for-the-IQ-smart to learning-can-take-place-every-moment-in-my-work (Claxton 1999). “Gee I did not know that this job gives me so many opportunities to learn” or, “I thought I wasn’t such an egghead, but I learned quite a lot in such a short time, and not only being lectured or reading things.” It is important, according to our experience, to start by focusing on what one has learned, not about what is lacking. A second reason to create awareness of learning processes and outcomes lies in the fact that people can only share the outcomes of learning when they are

aware of them. And thirdly, how can people improve their ways of learning when they do not know of what and how they learned?

Awareness of learning processes (thus explicit learning processes) can arise before, during or after the activities and processes. Often, however, this awareness does not arise at all (see for example Doornbos and Krak 2001; Eraut. 1998). When learning outcomes are implicit, people do not realize what they (have) learn(ed) during activities such as working, playing or problem solving. Awareness of learning outcomes can also arise before, during or after the activities or processes mentioned. And again, sometimes this awareness of learning outcomes does not arise at all. Learning remains fully implicit in that case (Borghans et al. 2007).

When Doornbos and Krak (2001) interviewed police officers about their work-related learning, they reported hardly any learning outcomes or learning processes. The word 'learning' made people look for courses they attended, books they read, coaching they received and so on. Only when the word 'learning' was not used and instead questions were asked about changes in behavior or work, people started to become aware that they had learned much in and from their work. By focusing on concrete changes in work processes or outcomes, they could become aware of their learning processes. And only after they became aware of what they had learned, did they start to talk about how they had learned.

It is neither possible nor desirable to make all implicit learning outcomes and processes explicit. Sometimes it is even better not to make implicit learning explicit. As Nonaka and his colleagues (Von Krogh et al. 2000) made clear, there can be an implicit kind of exchange. And it is within informal activities and settings, and without explicitness, that people develop a feeling of shared competences (Nonaka et al. 1998). But when one wants to become aware of one's implicit learning outcomes and processes, how could one do that?

There are different methods to use in order to make learning outcomes explicit. The first technique for making learning outcomes explicit through individual reflection came from Eraut (1998) and his colleagues. Instead of asking for learning outcomes directly, they asked (semi-)professionals (in their study: policemen and nurses) what had changed in their work. "In what ways is your current work different from one, two or five years ago?", "What does this tell you about what you know now and are now able to do that you were not able to at that time?". Another technique used is asking people to describe an ideal professional. For example: "How does an ideal human resource manager work?" People prove to have quite elaborated ideal models. The next question could be, "In what respect are you yourself already an ideal worker/professional?" This leads, almost automatically, to a discussion of differences between ideal and practice and from there to learning outcomes. For example, we met a human resource manager describing the ideal HR-manager as someone who is constantly networking with all line managers in the organization in an informal way. When talking about his ideals, he himself discovered that he was not practicing this at all. Thus, asking people to reflect on the difference between their picture of an ideal practitioner and their own explicit and implicit competences may help them become aware of learning outcomes reached and needs for more explicit learning afterwards. A third technique often used is the critical incidents

method. People try to think of practical situations that were critical. From there they start to think of the underlying competences.

This technique resembles the ‘pretty good practices’ approach described by Marsick (2001), in which people talk about examples of situations where they performed pretty well. Marsick noted that it is important not to ask for ‘best practices’ because we then put too much pressure on people to excel. In our experience, we found that it is even important to avoid talking about failures and focus on positive incidents. By positive critical incidents or pretty good practices, there is a greater willingness and there are less defense mechanisms to do some ‘research’ into details of the learning outcomes and processes.

Also, related is the ‘Story telling’-technique, where people tell anecdotes and stories from their practices. The difference here is the ‘story telling mindset’ activates a certain amount of detail in describing circumstances and events from a certain distance (talking about yourself in the third person). Another technique, described by Marsick (2001) is walking in the shoes of the client. People are invited to take the perspective of one of their clients and examine themselves through this perspective.

35.5.1 Elaboration 2: Transfer of Explicit Learning – The Way Back

“Transfer of learning occurs whenever prior-learned knowledge and skills affect the way in which new knowledge and skills are learned and performed” (Cormier and Hagman 1987, p. 1). In elaboration 2, research and practice become connected. This is mainly related to the application of new knowledge and skills to practical working situations. Simons (1999) described six transfer paradoxes that learners encounter when they need to apply new knowledge and skills in new working or learning situations. Four of these apply to the transfer of new explicit knowledge and skills to practical situations:

- *The paradox of using relevant prior knowledge.* Although it seems logical to make use of all the prior knowledge you have, there are also several good reasons not to do so. People may not be aware of the importance of the active use of prior knowledge. Using prior knowledge may require a great deal of work, may create confusion, may distract you from the main points, and may make your learning too idiosyncratic. Thus, from the perspective of the learner, the problem is when to use prior knowledge actively and when to protect oneself from its influences.
- *The paradox of recognizing relevant situations and conditions.* In these cases, people simply do not see that two or more situations or conditions are similar. When is a situation similar to another one? Indeed, there are so many dimensions on which situations differ (e.g., time, place, content, culture, mood, etc.). Bereiter (1995) described the main problem of transfer as a transfer between situations. How can one prepare for situations one cannot know? The only two things a learner can do (see also Bereiter 1995) are to strive for real and deep understanding

(optimizing the accessibility of the knowledge) and to collect knowledge about the situational conditions.

- *The paradox of near and far transfer.* In near transfer, there is a close connection between the learning situation (or the prior knowledge) and the application (or the new learning situation). In far transfer, the distance between prior knowledge or learning and application (or the second learning situation) is much greater (see Mayer and Greeno 1972). This is not a dichotomy; rather, it is a dimension of distance. This distance can sometimes be measured or manipulated (see Bassok and Holyoak 1989). However, the distance is a subjective measure that varies among individuals (Simons and Verschaffel 1992). An important hypothesis is that one has to do different things for near and far transfer; a strategy for near transfer may be inappropriate or ineffective for far transfer and vice versa. For near transfer, one needs the low road to transfer (Salomon and Perkins 1989): to automatize and practice in a small range of situations (contextualization) (see Simons 1990). For far transfer, however, the high road (Salomon and Perkins 1989) is better: decontextualization and practice in a variety of different situations are important strategies. For learners, the basic paradox is whether to go for near transfer and to confine the range of situations, focusing on practice and automatization, or to go for far transfer, searching for decontextualization and variety.
- *The paradoxical- What should one transfer?* Collins et al. (1989) distinguished four types of transferable elements: (a) domain-specific knowledge (concepts, rules, algorithms); (b) heuristic problem-solving strategies; (c) strategies for self-regulation; and (d) learning strategies. For learners, the paradox amounts to choosing among the various elements that could be transferred. What should and could the learner take with him or her to other situations? Is it possible to combine several elements?

These four transfer dilemmas demonstrate how complex the road from research to practice can be. Trainers tend to end a training session with questions about future applications. However, this is often not enough. Application in practice requires time and space to reflect and to find suitable ways of application. Transfer from new knowledge and skills to practice are by no means an easy task. For professionals, it is not sufficient to be connected to research; they need accomplish the transfer to their practice as well.

35.5.2 *Collective Learning and Co-creation*

Thus far, we described three basic forms of learning (practicing, inquiring and creating): the three islands. These islands are not automatically connected. For professional growth, connections between the islands are necessary. We introduced the metaphor of bridges between the islands, each being bi-directional: elaboration, expanding and externalizing. The previous sections described the two elaboration

bridges in more detail. Bridges are effective ways to bridge islands, but they are predominantly individual pathways.

As stated above, learning of professionals becomes more of a collective learning. The accelerating developments in our society make it necessary, but not enough, to have excellent professionals in a work force. Increasingly, these professionals need to be able to work together in solving problems and innovating more accurately and quickly. Thus, more professionals are working in teams, both interdisciplinary and monodisciplinary. By consequence of this, professionals should also learn collectively, they have to create spaces where co-creating takes place, and where through this process of working and reflecting together, develop mastery (Leonard and Swap 2005). This has not been discussed much so far. In our view, in the future, professional learning needs to be extended to collective learning. Two forms of collective learning are to be distinguished: organization-related collective learning and profession-related collective learning.

Organization-related collective learning refers to processes and intended outcomes of learning of a working team or an organization. Teams of professionals or teams including professionals decide to collaborate in learning, focusing on common learning activities and processes or on common outcomes. 'Communities of practice' (Wenger 1998), share a common interest in the organization and learn within and from their work and then share this learning.

Profession-related collective learning consists of professionals, working in different organizations, but sharing the same profession and deciding to learn together from their different practices. They do not have a common interest in one organization. They may be even competing for the same clients. Their common interest is in learning. Therefore, we call these 'communities of learners' and not 'communities of practice.' Collective outcomes can partly be the same as those of communities of practice, but additionally, they can relate to contributions to the professional field in terms of publications, lectures, tools, etc. All of these features of work environments can be organized individually as well as in collaboration with others: with colleagues, coaches, managers and clients. Each of these categories of actors may bring different perspectives and contributions to implicit learning.

For the collective connections between islands, we use the term polder. This is a new land between the islands (typically Dutch?). The processes of learning at two islands are integrated in a collective process. Professionals work together to integrate the learning processes at two or three islands. The polders we distinguish (e.g., action research, design based research, co-creation and pioneering) are all very well applicable to professional learning.

The first polder in between practice and research is about investigating one's own practice. Practitioners study their own practice, primarily together. In the second polder (between research and creation), creating and inquiring are combined and become inseparable. New products or services are designed in an alternating process of investigating and designing. Instead of designing something in a linear way, one attempts various possibilities and then compares and studies these. It is this polder, which is necessary, not for improvement, but for innovation.

The third polder is in between practice and creation: practicing and creating are combined socially in improving the practice and infusing new ways of working. Practitioners and designers work closely together or practitioners develop their own tools or publications on the basis of existing material. The fourth polder component of our model is in the middle and makes use of all three islands. It is related to transformation of a practice by creating a space for piloting and experimenting by starting from scratch. Beforehand, one cannot determine what direction should be taken and what should change or not. In pioneering, practitioners do pilots and prototyping in running their practice, combining practice, research and creation.

Here we will elaborate action research, the polder between practice and research as an example. Ruijters (2006) described the other four polders in detail.

35.5.3 Using Action Research to Co-create

Professionals executing practice-oriented research, work together in investigating their own practice(s). Through action research, professionals strive to improve their professional practice through continual learning and progressive problem solving. Moreover, they try to deepen their understanding of practice and to develop a well-specified theory of action. Finally, they try to realize improvements in the community in which their practice is embedded through participatory research. Through the systematic collection of data, professionals are searching for answers to questions that arose during practice and will help to improve that practice. Although scientific knowledge is not the first aim of action research, it is not excluded. The first aim of action research is finding answers to practical questions, solving practical problems and improving practices.

Riel and Lepori (2011) stated that in action research, professionals gradually come to live their theories. This happens in a series of reflective stages. Studying, acting, collecting evidence and reflecting help professionals to develop their personal and collective theories. Moreover, at the scholarly level, professionals also contribute to the larger disciplinary community.

Closely related to this is the recent focus on evidence-based practice. Groups of professionals try to apply firm scientific evidence that fulfills certain strict criteria of reliability and validity into their practice. These forms of application will not happen easily, however, as these often ask for fundamental changes in practice. Therefore, collaborative action research is needed for professionals to help each other in finding ways to accomplish this. De Groot (2012) showed, for instance, that communities of veterinary doctors found it very difficult to reflect deeply and critically on new evidence coming from veterinary science. Recently, action research occurs sometimes in close cooperation with more theory-oriented research groups at universities. Another perspective is that evidence is not only coming from research, but also from practice: practice-based evidence. Professionals collect evidence through action research. They investigate the effectiveness of their practices (Fig. 35.3).

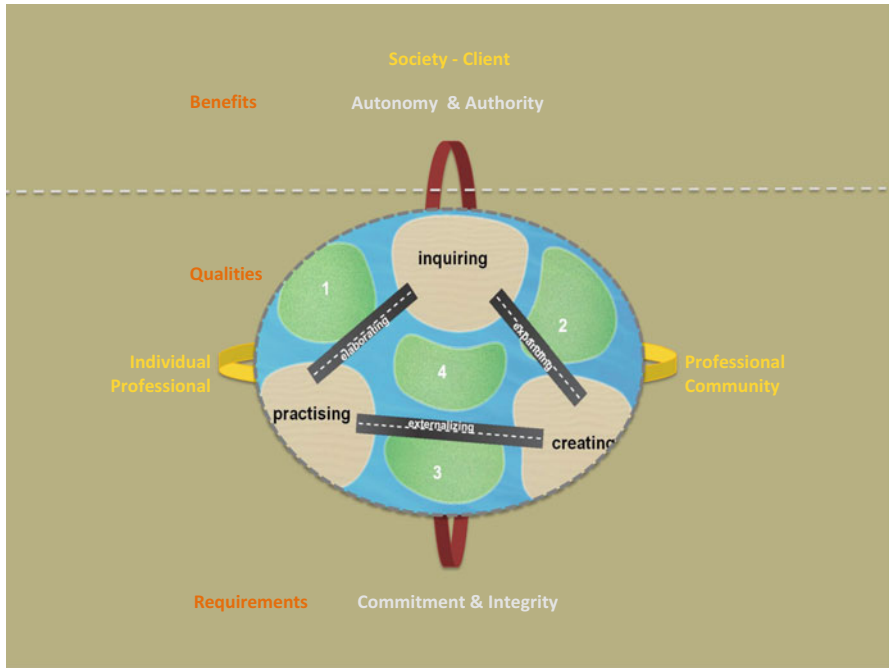


Fig. 35.3 The self-determined learning professional

35.6 Conclusion and Discussion

We first defined a professional by stating that it is a choice and involves responsibilities, capacities and benefits. The question no longer is: who is a professional, but who chooses to be a professional. And by implication, if you choose to be a professional – how do you shape your professional development in order to remain a professional. Professionalism thus starts with a commitment to clients, the profession, the organization and society. Because a professional is also a knowledge worker and knowledge becomes obsolete quickly, there is also a need for integrity: balancing between technics, pragmatics and ethics, as well as learning from experiences. The main qualities of a professional are having a body of knowledge (i.e., being anchored to theory), and having a theory of action, as well as being able to make translations from theory to practice and vice versa. This also means being able to extend theories with new hypotheses. Finally, the professional develops an own field of expertise from which contributions to the profession and fellow professionals can be made. Three ways of learning form the basis: (a) inquiring: learning through inquiry, (b) practicing: implicit experiential learning, and (c) creating: learning through design. We call these the three islands of learning. Because these islands do not connect automatically, there is a need for more than the isolated ways of learning: connection and reflection. That is what occurs at the bridges:

(a) elaborating: translating new knowledge into practice and translating practice into personal theory, (b) expanding: finding new tools and products on the basis of new knowledge and finding gaps in knowledge needed for design, and (c) externalizing: translating design knowledge into practice and finding needs for new products and tools. With these ways of learning, a professional can learn individually. However, collectivity is lacking. This collectivity is crucial for the profession to grow and survive. Four ways of collective learning we distinguished as polders are: (a) collaboratively investigating one's practice, (b) collaboratively working on long-term innovation, (c) collaboratively redesigning semi-finished products, and (d) pioneering: combining practice, research and design in pilots and prototypes.

Being a professional thus is a choice to use one's knowledge, theories of action and field of expertise in a committed and integer way, in service of clients and society. This requires the described forms of individual and collective learning and development as well as making learning experiences explicit, reflecting on learning and regulating one's own learning in a self-directed way. Autonomy and authority will occur as a consequence of this professional attitude and way of working.

Our new model of professional learning, defining professionalism in a dynamic way and relating it to various ways to learn, is in essence a normative model of professionalism. It specifies what and how professionals should be involved in individual and collective learning and how they can organize this. How can the model be used? Thus far, we used the learning landscape model in three ways. The first is mapping learning of professionals and their organizations: which islands of learning are visible and how large are these islands, what bridges appear and how strong are these? Do we see polders and how extensive are these? This can help learners and their organizations see where their strengths and weaknesses are in terms of learning. What islands, bridges and polders are dominant; which ones are absent. The second way of using the model is by reconstructing previously executed learning trajectories. How can we place interventions and ways of learning in the learning landscape? With "post-its," we placed all of these on a drawing of the learning landscape. This helped learners to find one-sidedness and gaps in their approaches. The third way application was in designing learning trajectories. Systematically, we co-created learning trajectories that encompassed the whole learning landscape. Here, the model is a kind of heuristic helping people to design learning in more systematic ways.

For individual professionals, this model implies:

- They should carefully monitor their own development,
- They should regularly question their own commitment,
- They should reflect on the ways they deal with the tensions between technics, pragmatics and ethics, in relation with (practical) knowledge,
- They should think about the way they deal with autonomy,
- They should be aware of their authority and reflect on it regularly,
- They should actively work on their body of knowledge, their theories of practice and their fields of expertise, and
- They should seek connections with fellow professionals and science.

For organizations, this means that they understand that professionals are the owners of their own development and that steering the development of professionals or the profession can only take place through invitation, seduction and not through control and obligation. Although parts of the island's model are based on empirical research, the generalizations still await further empirical testing. We hope that researchers will take the challenge to test these generalizations and that we will be able to do that research ourselves in the years to come.

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Chapter 36

Team Learning in Education and Professional Organisations

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Abstract This chapter starts with a short history of team learning. Learning in group has been a research topic for quite some time in education. Studies on problem-based and project-based learning will be overviewed. Different explanations of the effects found will be discussed.

In a next part, we will make an overview of recent studies on team learning in different types of teams and organisations. In this overview, it will become clear that team learning works slightly different in different contexts.

Finally, conclusions from the presented research will be formulated.

Keywords Team learning • Problem-based learning • Project-based learning

36.1 Introduction: Team Learning and Collaborative Learning

The importance and use of teamwork increased dramatically in the past three decades both in professional organisations and in the context of education. Across Europe teamwork has been incorporated into companies' overall strategy as a core element

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in new forms of work organisation (European foundation for the improvement of living and working conditions 2007). Within the US the study of Lawler et al. (1995) demonstrated how 68 % of Fortune 1,000 companies reported to use self-managing work teams in 1993 as compared to 28 % in 1987. A team can be defined in many different ways, in this chapter, we use the ‘team’ definition of Cohen and Bailey: “*A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and are seen by others as a social entity embedded in one or more larger social systems (...), and who manage their relationships across organisational boundaries*” (Cohen and Bailey 1997, p. 241).

The growth of teamwork in modern organisations shows to be unstoppable as there is scientific evidence that teamwork can help organisations to deal with more complex tasks and a changing environment (Brousseau 1997; Mathieu et al. 2008; Senge 1990a, b; Zaccaro et al. 2008). However, although teamwork is often used as a ‘positive’ word, it only ‘works’ under certain conditions (West 2004). Recent research shows that for teams to work effectively, one of the ‘key’ conditions is that they engage in team learning processes and learn how to work effectively (Mesmer-Magnus and DeChurch 2009; Savelsbergh et al. 2007; Van Den Bossche et al. 2006; Van Woerkom and Croon 2009).

Also in education, working and learning in small groups has been used for many decades and still becomes more and more popular. Many different forms of collaborative or cooperative learning became popular since the 1960s. Problem-based learning and project-based learning can be considered as one of the few curriculum-wide educational innovations that are still surviving and still increase in popularity (Gijbels et al. 2013; Schmidt et al. 2009). Also competence based learning in educational programmes is mainly based on collaborative learning and assessment formats.

The current book chapter will start by presenting an overview of the origin and history of team learning. This section will elaborate on how team learning is related to collaborative learning within educational settings while at the same time having its distinct features (Sect. 36.2). In the following section, more background is provided about collaborative learning in education (Sect. 36.3). Empirical evidence is provided and specific attention is given to problem based and project-based learning. Subsequently, different theoretical models of team learning in professional contexts are introduced (Sect. 36.4) and empirical research on the antecedents and outcomes of team learning are presented (Sect. 36.5). Finally, the conclusions and directions for future research are discussed (Sect. 36.6).

36.2 History of Team Learning

The term ‘team learning’ was introduced to a wider audience in the beginning of the nineties with Senge’s bestseller ‘The Fifth Discipline’ (1990b; Edmondson et al. 2007). It was argued that not individual learning, but team learning is the true motor

in creating a learning organisation. By means of dialogue and thinking together about complex issues, innovative and coordinated action, and good communication with members from other teams within the organisations, teams were hypothesised to create a potential basis for continuous organisational growth and change.

But is team learning really such a new phenomenon? Or is the new word ‘team’ used here as a permit to separate research on team learning from research on collaborative or cooperative learning? After all, the subject of education through collaboration or cooperation in interdependent small groups is certainly related to the field of team learning. And this field of research is certainly blessed with a long and prosperous history: “*Cooperative learning is an old idea. The Talmud clearly states that in order to learn you must have a learning partner. In the first century, Quintillion argued that students could benefit from teaching one another. The Roman philosopher, Seneca advocated cooperative learning through such statements as, “Qui Docet Discet” (when you teach, you learn twice). Johann Amos Comenius (1592–1679) believed that students would benefit both by teaching and being taught by other students*” (Johnson and Johnson 1989, p. 12).

At the end of the eighteenth century Lancaster and Bell wrote the first articles about cooperative learning groups in education (Salmon 1932). The first scientific work on the subject is traced back to the beginning of the twentieth century with the early writings of influential thinkers such as John Dewey, Lev Semenovič Vygotsky, Kurt Lewin and Jean Piaget (Johnson and Johnson 1989). John Dewey (1936, 1940) promoted the use of cooperative learning groups as part of his project method in instruction. Vygotsky (1979) defined human learning as fundamentally social and the zone of proximal development as the distance between someone’s original development level and the level of his potential development when collaborating with more capable peers. Lewin (1939; Lewin and Grabbe 1945) wrote his field theory and experimentally showed the importance of groups for education.

According to Johnson and Johnson (1989) both practice and research on cooperative learning fell out of favour in the build-up to the Second World War, losing its attraction for about 25 years. Interpersonal competition and individualistic learning regained popularity until a renewed interest in cooperative learning was cultivated in schools at the beginning of the eighties.

It would be tempting to argue that the term ‘team learning’ is just a new fashionable term used by modern organisations for something that has been part of educational practice and research for a very long time. However, there is something different about the team learning concept Senge introduced. In contrast to the strands of collaborative and cooperative learning, team learning was theorised in terms of conditions and processes that lead to learning outputs at the level of the team, such as mutually shared cognition, shared vision, specific team products, innovations, increased team productivity, group-efficacy, etc. Certainly cooperative and collaborative learning are primarily about conditions and processes that lead to learning outputs at the level of the individual, such as academic achievement, higher-level reasoning, retention, creativity, achievement motivation, intrinsic motivation, transfer of learning, self-esteem, social competencies, psychological health, etc. (Johnson and Johnson 2003).

In the past 20 years, several authors have contributed significantly to the theoretical development of this team-level learning concept. As noted above, a first important theoretical contribution was the work of Senge (1990a, b; Edmondson et al. 2007), who developed the team learning concept in the footsteps of the emerging discipline of the learning organisation. He constructed a double learning cycle, connecting learning of individuals (reflecting, connecting, deciding and doing) to learning processes at the level of the team (public reflection, shared meaning, joint planning and coordinated action).

In 1993, Dechant et al. did a second theoretical effort to capture team learning, and developed a team learning model with five central team learning processes: framing, reframing, experimenting, crossing boundaries and integrating perspectives. In contrast to Senge's work, they did not focus on learning at the level of the organisation, but really focused on learning at the level of the team. Also, they were the first to model how team learning develops in the course of time. In the same year developed a multi-level system perspective on team learning. She opened the door to a 'learning curve' conceptualisation of team learning, in which learning by doing is considered to be a valuable aspect in the gradual collective adaptation towards improved team performance.

In 1994, Brooks increased our understanding of team learning by distinguishing between on the one hand reflective work, which is essentially about problem posing, sharing knowledge and information, and integrating shared knowledge, and on the other hand active work, which is essentially about gathering data from outside the team boundaries. Although Senge (1990a, b), Argote (1993), and Dechant et al. (1993) discussed barriers for team learning, she was the first to truly focus on the role of power.

In 1997, Hinsz et al. highlighted a paradigm-shift in small-group performance research and described the emerging view of groups as information processors. They were the first to extensively review research on processing objectives, attention, encoding, storage, retrieval, processing, response, feedback, and learning in teams. Whereas, the previously mentioned authors discussed team learning primarily from a socio-cultural perspective, where the emphasis is placed on the alignment of social interactions between group members (e.g., development of group mind in Weick and Roberts 1993), these authors were the first to integrate research regarding team learning from a cognitive tradition (e.g., team mental models in Klimoski and Mohammed 1994; transactive memory systems in Wegner et al. 1991). From this cognitive tradition, they put the emphasis in group learning on what happens within the minds of individual group members, and how individual cognitions can be coordinated and adapted between group members in the pursuit of increased group effectiveness and improved group learning.

In 1998, Tannenbaum et al. described the team learning processes as a cyclical process of pre-brief, team activity and post-action review. Moreover, they were the first to really focus on the role of facilitators in supporting team learning. In 1999 Edmondson wrote an influential article about psychological safety and learning behaviour in teams in which she similarly described team learning as an on-going process of action and reflection, characterised by asking questions, seeking feedback,

experimenting, reflecting on results, and discussing errors or unexpected outcomes of actions. The major contribution from her work is that she showed how team leaders can create an environment in which team members are not afraid to contribute ideas, ask questions, admit mistakes, give feedback, etc. if they wish to support team learning.

From the turn of the millennium onwards, theoretical research on the subject of team learning flourished enormously (Argote et al. 2001; Decuyper et al. 2010; Edmondson et al. 2007; Gibson 2001; Homan 2001; Kayes and Burnett 2006; London and Sessa 2006, 2007; London et al. 2005; Rupert and Jehn 2006; Savelsbergh et al. 2008; Sessa and London 2008a, b; Wilson et al. 2007). Similarly, the number of empirical studies on the topic grew exponentially. Decuyper et al. (2010) for example introduced the interdisciplinary approach that led to the recognition of eight team learning processes (see further, Fig. 36.5).

Due to this increased interest in and execution of team learning research, we can state today that the complexity and dynamism of the subject turned into a hallmark of the field. Currently, the field of team learning spans the disciplines of learning sciences, labour, social and organisational psychology, sociology, management, communication, political science, labour pedagogy, information science, and organisational theory (Poole et al. 2004; Van Den Bossche 2006). Nevertheless, although many authors contributed to the theoretical development of the team learning construct, only few crossed the boundaries of their discipline.

36.3 Collaborative Learning in Education

In today's learning environments in education a more active role for learners is stimulated. Learning becomes more central and is not a side effect. Because of the swift changes in knowledge it is important that the students learn to learn (meta-cognition). Learning is not pre-planned and organised by an outsider. The learners decide themselves how and what they learn (Simons et al. 2000). Cooperative learning becomes more and more important to facilitate learning and higher order thinking (Cohen 1994). *Cooperative learning* is a setting where people learn together in a group that is small enough to allow active participation of each group member (Krause et al. 2009). One can see this group process as cooperative learning or collaborative learning. In *cooperation*, partners split the work, solve sub-tasks individually and then assemble the partial results into the final output (Sawyer 2006). In *collaboration*, partners do all their work together. Collaborative work can be seen as sharing ideas, knowledge, competences and information to accomplish a task or goal (Nunamaker et al. 1991). Both terms have a lot in common. Still we prefer to term 'collaborative' since it stresses not the division of work in a small group but rather the interaction in the group in all activities.

As Dillenbourg argues in his famous chapter in 1999 (p. 5): "Collaborative learning is not one single mechanism: if one talks about "learning from collaboration", one should also talk about "learning from being alone"". Individual cognitive systems

do not learn because they are individual, but because they perform some activities (reading, building, predicting, ...) which trigger some learning mechanisms (induction, deduction, compilation, ...). Similarly, peers do not learn because they are two, but because they perform some activities that trigger specific learning mechanisms. This includes the activities/mechanisms performed individually, since individual cognition is not suppressed in peer interaction. But, in addition, the interaction among subjects generates extra activities (explanation, disagreement, mutual regulation, ...) which trigger extra cognitive mechanisms (knowledge elicitation, internalisation, reduced cognitive load, ...). The field of collaborative learning is precisely about these activities and mechanisms. These may occur more frequently in collaborative learning than in individual condition. However, on one hand, there is no guarantee that those mechanisms occur in any collaborative interactions. On the other hand, they do not occur *only* during collaboration. At some level of description – at least the neuron level-, the mechanisms potentially involved in collaborative learning are the same as those potentially involved in individual cognition.

Collaborative learning is not a method because of the low predictability of specific types of interaction. Basically, collaborative learning takes the form of *instructions* to subjects (e.g., “You have to work together”), a physical *setting* (e.g., “Team mates work on the same table”) and other institutional *constraints* (e.g., “Each group member will receive the mark given to the group project”). Hence, the ‘collaborative’ situation is a kind of *social contract*, either between peers, or between peers and the teacher (then it is a didactic contract). This contract specifies conditions under which some types of interactions *may* occur, there is no guarantee they will occur. For instance, the ‘collaboration’ contract implicitly implies that both learners contribute to the solution, but this is often not the case. The efficacy of collaborative learning depends on the complex interaction between three components: the individual students, the group they are participating in, and the assignment they are collaborating on Schellens et al. (2007).

36.3.1 *Empirical Evidence for Collaborative Learning*

There exists a lot of research on collaborative learning. Research has already proven that cooperative learning can improve knowledge acquisition (Lou et al. 2001), elaboration of subject matter (Krol et al. 2004), and mindfulness (Lambiotte et al. 1988). Collaborative learning can also lead to a deeper level of learning, critical thinking, shared understanding, and long-term retention of the learned material (Garrison et al. 2001; Johnson and Johnson 1999). From a social point of view collaborative learning leads to a better development of social and communication skills, more positive perceptions towards group members, better social relationships and higher levels of group cohesion (Gupta 2004; Johnson and Johnson 1989; Johnson et al. 2007). Johnson and Johnson (2003) did a large review about the value of cooperative learning against individual learning and competitively

learning. They found that groups perform better, take better decisions and are better in solving problems than individuals or competitively oriented groups. They also discovered that in a collaborative group, there is a bigger interrelation attraction than in competitive oriented groups. Their findings also showed that group efforts promoted greater social support than the other two forms of learning. Finally, collaborative learning results in a higher level of psychological health and in a higher level of self-esteem. As a consequence, collaborative learning gained more and more interest. Research on the effectiveness of these forms of collaborative learning has been done primarily in the area of problem-based learning (PBL) and to a lesser extent in project-based learning (PjBL). Although there are many forms of collaborative learning, problem-based learning and project-based learning are probably two of the most well spread, particularly in higher and academic educational programmes (Tynjälä and Gijbels 2012).

36.3.1.1 Problem-Based Learning

Although originally developed for medical training in Canada at McMaster University, the orthodox version of problem-based learning (PBL) has been modified and applied globally in many disciplines (Gijbels 1995). Within the literature, PBL has been defined and described in different ways. On the basis of the original method as developed at McMaster University, Barrows (1996) described six core characteristics of PBL. The first characteristic is that learning needs to be student-centred. Secondly, learning has to occur in small student groups under the guidance of a tutor. The third characteristic refers to the tutor as a facilitator or guide. Fourthly, authentic problems are primarily encountered in the learning sequence, before any preparation or study has occurred. Fifthly, the problems encountered are used as a tool to achieve the required knowledge and the problem-solving skills necessary to eventually solve the problem. Finally, new information needs to be acquired through self-directed learning.

The aim of schools and colleges implementing PBL is to educate students that are able to understand and solve complex problems in a changing world (Gijbels et al. 2005). The interest in the question towards the effects of PBL has produced, until now at least, eight systematic reviews on the effects of problem-based learning (see also Gijbels et al. 2013). The review by Albanese and Mitchell (1993) is probably the most well known. The main results from this review are that PBL is more nurturing and enjoyable and that PBL-graduates perform as well, and sometimes better, on clinical examinations and faculty evaluations than students in more conventional instruction. However, PBL students score occasionally lower on basic science examinations and view themselves as less well prepared in the basic sciences in comparison to their conventionally trained counterparts. Further, PBL-graduates tend to engage in backward reasoning rather than the forward reasoning experts engage in. Finally, the costs of PBL are high when class sizes are larger than 100.

At the same time, Vernon and Blake (1993) synthesised all available research from 1970 through 1992 comparing PBL with more conventional methods of medical

education. Five separate statistical meta-analyses resulted in the following main results: PBL is found to be significantly superior with respect to students' attitudes and opinions about their programs and measures of students' clinical performance. Contrary to the previous reviews findings, the results of PBL students do not significantly differ from conventionally taught students on miscellaneous tests of factual knowledge and tests of clinical knowledge. However, students from conventional education perform significantly better than their PBL counterparts on the National Board of Medical Examiners (NBME), a standardized test administered to medical students in the US.

Berkson (1993) also searched for evidence of the effectiveness of PBL in the medical PBL-literature till 1992. Six topics on the effectiveness of PBL compared to conventional curricula underlie this narrative meta-analysis in the medical domain: problem-solving, the impart knowledge, students' motivation to learn medical science, the promotion of self-directed learning skills, student and faculty satisfaction, and the financial costs. The results showed no distinction between graduates from PBL and conventional instruction, but PBL can be stressful for both students and faculty and a PBL curriculum may be unreasonably expensive.

Subsequently, Colliver (2000) questioned the educational superiority of PBL relative to standard approaches. Colliver focused on the credibility of the claims about the ties between PBL and educational outcomes and the magnitude of the effects. He conducted a review of medical education literature, starting with the three reviews published in 1993 and moving on to research published from 1992 through 1998 in the primary sources for research in medical education. Colliver concluded that there is no convincing evidence that PBL improves the student's knowledge base and clinical performance, at least not of the magnitude that would be expected given the resources required for a PBL curriculum. Nevertheless, PBL may provide a more challenging, motivating and enjoyable approach to medical education.

One of the more recent reviews by Smits et al. (2002) is limited to the effectiveness of PBL in continuing medical education. This review only included controlled evaluation studies in continuing medical education from 1974 to 2000. In short, Smits and colleagues concluded that there is limited evidence for PBL to increase participants' knowledge, performance, and patients' health. However, there was only moderate evidence that doctors were more satisfied with PBL.

The review by Dochy et al. (2003) was the first review searching for studies beyond the domain of medical education. The main question was similar but much more itemised than the other reviews: What are the main effects of PBL on students' knowledge and knowledge application and what are the potential moderators of the effect of PBL? The results of this meta-analysis suggested that PBL has statistically and practically significant positive effects on students' knowledge application. The effects of PBL on students' knowledge base tended to be negative. However, this effect was found to be strongly influenced by outliers (i.e. studies with high effect sizes possibly overestimating the overall effect). In addition, the moderator analysis on the retention period of students' knowledge suggested that students

in a PBL environment have slightly less knowledge but remember more of the acquired knowledge, because they can rely on a more structured knowledge-base (Dochy et al. 2003).

In order to further investigate the moderating effect of the method of assessment on the effects of PBL, a second meta-analysis was set up (Gijbels et al. 2005). In this meta-analysis, the influence of assessment was the main independent variable. The goal of this study was to describe the effects of PBL from the angle of the underlying focal constructs being measured with the assessment. Using Sugrue's model (1995) as a frame of reference, the research questions were: What are the effects of PBL when the assessment of its main goals focuses on respectively (1) the understanding of concepts, (2) the understanding of the principles that link concepts, and (3) the linking of concepts and principles to conditions and procedures for application? In order to be congruent with its educational goals and resulting instructional principles and practices, the assessment of the application of knowledge when working with authentic problems is at the heart of the matter in PBL. Therefore, it was expected that students in PBL perform better at the third level when compared to students in more traditional learning environments. The results of the meta-analysis showed a difference in the reported effects of PBL between each of the three levels. However, different from expectations that the effects of PBL are larger when the method of assessment is more capable of evaluating complex levels, the effect size for the third level of the knowledge structure was smaller compared to the effect size of the second level and not statistically significant. Moreover, in only 8 of the 40 studies included in the meta-analysis the assessment focused at the third level. Most studies (N=31) assessed at the level of understanding of concepts. PBL had the most positive effects when focal constructs being assessed were at the second level, understanding the principles that link concepts. These results imply an implicit challenge for PBL to pay more attention to the third level of the knowledge structure, both during the learning activities that take place and students' assessment.

Finally, the meta-analysis by Walker and Leary (2009) builds upon the studies by Dochy et al. (2003) and Gijbels et al. (2005). They performed a meta-analysis that crossed disciplines as well as categorised the types of problems used, the PBL approach employed, and the level of assessment. Across 82 studies and 201 outcomes their findings favour PBL. In addition, the homogeneity analysis indicated that a closer examination of potential moderators was needed.

36.3.1.2 Work-Based Project Learning

Project-based learning can be seen as a pedagogical innovation that integrates theory and practice by means of problem solving related to working life issues (e.g., Blumenfeld et al. 1991; Van den Bergh et al. 2006). The main difference from problem-based learning is that the problems are more complex: they are not just authentic but real in the sense of requiring a real solution from the students. On the other hand, just as with problem-based learning, project-based learning can in practice

assume a variety of forms. Blumenfeld et al. (1991) provide a useful basic definition. According to them, the essence of project-based learning is that a question or problem serves to organise and drive activities; also that these activities culminate in a final product that addresses the driving question (Blumenfeld et al. 1991; see also Helle et al. 2006). Naturally, this basic definition can be specified further. Characteristics linked with project work include student-centeredness (i.e., involving the student in aspects such as setting learning objectives, deciding upon work procedures, etc.) together with the fact that it goes on for a long period of time and that the work is organised in a systematic fashion (see also Helle et al. 2006; Tynjälä et al. 2009).

Within the current section, the focus is on work-based project learning. Within this form of project-based learning the project or problem the students are working on is derived from working life practice. The project is based on a collaboration between a professional organisations and the student group and its teachers. The professional organisation presents an authentic, real life problem that they are facing and in collaboration with the students a solution is sought. Unfortunately, a particular difficulty of this form of learning lies in the – often lacking – readiness of both parties to collaborate.

In a their review of the literature on work-based project learning and its impact on learning in post-secondary education, Helle et al. (2006) concluded that the research was so limited as to be virtually non-existent. Since then, however, some researchers have collected empirical evidence which tends to support the learning resulting from project-based learning, and which also illustrates the model of Integrative Pedagogy. Verpoorten et al. (2010) investigated the learning outcomes of a project-based learning course “Interdisciplinary Project (IP)” within a masters program. During the IP students work in groups of six students, spending 9 months on a specific but complex task formulated by an external bidder. The authors administered the Inventory of Learning Styles (Vermunt 1992) to assess students’ self-regulated learning and conducted semi-structured interviews with students 1 year after they finished the course. They asked about the kinds of learning outcomes that students recognised during the project, and how the students evaluated the learning in project-based learning as compared to the other courses in the program. The results indicated that for all students the “real assignment” work was found motivating. Students reported that they had learnt more or different issues compared to other courses, but also that the workload was high, partly because they did not have all the information they needed to solve the task right from the start of the course. Students reported that they learnt much from the discussions within the project group and from the peer assessment within the group. They improved their skills in analysing problems and in developing, carrying out and monitoring plans. At the same time they learnt to function in a team and to give guidance to a team. They reported that by writing minutes and reports and by communicating with external organisations their communication skills had improved. Another reported learning outcome involved the realisation that theory can work differently in practice. Working and learning in projects draws heavily on the independence of the students and on the ways in which independent students can monitor their own

learning activities. This seems to make all the difference between working and learning in the project team as, on the one hand, an exciting opportunity, or on the other, an intolerable burden.

Helle and Tynjälä (2007; Tynjälä et al. 2009) reported similar findings on the learning outcomes of project-based learning in a course on information systems design. They divided different forms of learning results into three basic categories: (1) domain-specific knowledge and skills, (2) generic working-life competences (such as communication and teamwork skills), and (3) the development of professional identity (involving the strengthening of the self concept and clarifying career prospects). Of these outcomes the second and the third group are less easy to gain through traditional classroom study. Helle et al. (2007) also found motivational effects in their studies, as did Verpoorten et al. (described above). The results indicated that the intrinsic study motivation of students increased substantially during the project-based course, while motivation remained stable among the control group students who lacked any project-based learning component in their studies. Furthermore, and even more interestingly, the results indicated that students who were originally ranked lowest in self-regulation profited most in terms of intrinsic study motivation. The authors concluded that project-based learning seems to provide students with a learning environment that prepares them well for their future work.

The literature on collaborative learning within education has shown the potential benefits that team learning within organisations can have. In general results show that students learn better cooperatively than they do individually. The research on problem based on project-based learning however also shows that several factors influence these potential benefits of learning and working together. However, it is also important to notice that considerable differences exist between educational and professional contexts. On the one hand, one of the most important differences is that learning ‘an sich’ is not a goal within professional organisations in contrast to educational settings. On the other hand, project-based learning, which is oriented towards working life and requires authentic solutions that will be applied within the professional organisation, already forms a bridge between both contexts. However, due to the differences between both contexts specific models on team learning in professional organisations have been developed.

36.4 Team Learning in Professional Organisations

Also recently, several researchers have tried to model team learning in professional contexts. At least five models that do try to understand the processes behind team learning can be found: (1) the model of work-team learning (Edmondson 1999), (2) the model of team learning process (Edmondson 2002), (3) the model of group continuous learning (Sessa and London 2006), (4) the model of team learning beliefs and behaviours (Van den Bossche et al. 2006) and (5) the integrative systemic model for team learning (Decuyper et al. 2010).

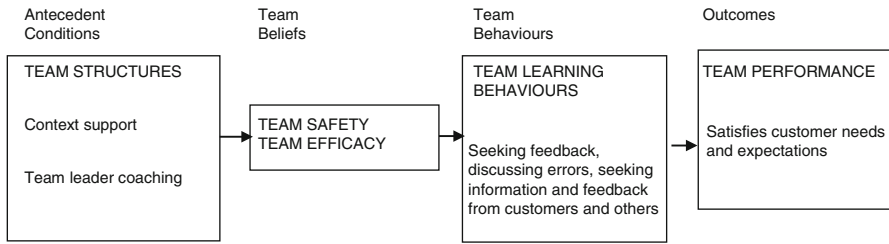


Fig. 36.1 Team learning model (Edmondson 1999, p. 357)

36.4.1 Model of Work-Team Learning (Edmondson 1999)

Edmondson (1999) studied real organisational work teams from different types, using both qualitative and quantitative methods to examine the model constructs. She observed a variable extent to which teams engaged in team learning behaviour, providing the perfect environment to examine team learning factors. She stated that team learning behaviour is significantly positively associated with team performance and that psychological safety significantly predicted team learning behaviour, as can be seen in Fig. 36.1 above.

Figure 36.1 shows the variables in the team learning model, such as team structures, team safety and efficacy, team learning behaviour and team performance.

Results from Edmondson's research revealed that team psychological safety is associated with team learning behaviour, that team efficacy is associated with team learning behaviour and that team efficacy predicts team learning behaviour when controlling for team psychological safety. The different concepts of her model will be discussed into more depth.

36.4.1.1 Team Efficacy

Previous research has examined group efficacy as a group-level phenomenon (e.g., Guzzo et al. 1993) or linked team efficacy with performance (Gibson 1996; Lindsley et al. 1995). However, research has not defined methods through which joint ideas of efficacy result in higher levels of performance. Edmondson (1999) suggests that efficacy stimulates the confidence among team members, promoting team learning behaviour and working towards an accomplishment of the shared team goal. When team members doubt about speaking up about previous errors, a positive result may be achieved when two conditions are satisfied: (1) team psychological safety; they feel safe and feel they will not be rejected (relating to interpersonal threat) and (2) team efficacy; they feel capable as a team to use this new information to create positive results (relating to team performance). In sum, these are two complementary concepts; team efficacy adds to the positive effect of psychological safety on team learning.

36.4.1.2 Team Leader Behaviour and Context Support

Team effectiveness can be increased by enhancing structural features such as a clearly defined team goal, an enabling design (with context support such as access to proper resources, information, etc.) and team leader behaviours (such as coaching, giving direction) (Hackman 1987; Wageman 1995). Edmondson (1999) uses these structural features to explain antecedents of team psychological safety. Context support, for instance, stimulates team psychological safety as it reduces insecurity and defensiveness in a team. Next, team leader behaviour also has a positive effect on team psychological safety, as salient, supportive and coaching-oriented behaviour may result in an environment which is believed to be safe by team members, and, in contrast, authoritarian or punitive behaviour may obstruct members to engage in interpersonal risk-taking involved in team learning behaviour (Edmondson 1996).

In sum, team psychological safety can be considered as a state including structural features to achieve behavioural results, or as a ‘mediator between the antecedents of team leader coaching and context support and the outcome of team learning behaviour’ (Edmondson 1999). Furthermore, Edmondson (1999) states that ‘team efficacy mediates between the antecedents of team leader coaching and context support and the outcome of team learning behaviour’, meaning that team members will feel more confident about their chances of success in a supportive and safe environment, therefore resulting in team efficacy and consequently promoting team learning.

36.4.1.3 Team Type

Various types of teams can be distinguished in various dimensions, ranging from cross-functional vs. single-functional, to time-limited vs. enduring and manager-led vs. self-led teams (Edmondson 1999). Although team learning behaviour may differ in various team types (e.g., a time-limited new product development team vs. an on-going self-directed production team), the relation of team psychological safety with team learning behaviour applies across different types of teams. Therefore, team type does not significantly influence team learning behaviour when assessed with other variables as discussed in the model below, whereas team psychological safety and team efficacy do have an important effect.

36.4.2 Model of Team Learning Process (Edmondson 2002)

Later on, Edmondson developed a social psychological model that explores the concept of trust and collective learning in teams. In order to do so, she conducted several field studies in organisational settings. The model states that interpersonal risks can reduce collective learning and distinguishes psychological safety from trust, by defining three elements of psychological safety that differ from trust; the

timeframe, the object of focus and level of analysis. Furthermore, it explains the reasons of the improvement of interpersonal risks and structured learning processes in teams by psychological safety. Practically, this model can be used by team leaders to help the participants in managing and overcoming the risks of learning, e.g. losing face or other risks that can threaten or damage the image others hold of them.

The model has been based on the idea that people are consciously and unconsciously hesitant towards certain behaviour that could change or damage the image others have of them. The immediate social context can influence this behaviour. The complex organisational culture cannot fully improve uncertainty and anxiety, as many individual interpersonal risks remain hidden and tend to be set to the background.

Many people tend to minimise the risk to their image, especially in a work-related setting and in front of those people that formally evaluate them, as instrumental (promotions, other beneficial advantages) and socio-emotional (preference of approval above disapproval) factors are involved. The model discusses how the creation of conditions with a low interpersonal risk can help in minimising this risk. Four specific risks can be distinguished: (1) being seen as ignorant, (2) incompetent, (3) negative or (4) disruptive. Each risk can be activated by different team learning behaviours. Overall, the model describes the collective learning process, explaining concepts of psychological safety, the process of team learning, the role of the team leader and how these concepts are related.

Edmondson uses the term 'psychological safety' to describe the extent to which people consider the work environment to be safe to take interpersonal risks or 'putting themselves on the line' (making mistakes, asking questions, proposing new ideas etc.), thereby benefitting from learning. However, team psychological safety does not imply group cohesiveness, which can undermine individual thinking and can result in the absence of interpersonal risks. It does create an environment for productive group discussion and shared goals. According to Edmondson, it is essential to firstly create conditions of this psychological safety and secondly develop a collective learning process with a compelling goal in order to achieve effective learning in organisations, as psychological safety creates engagement and a goal provides direction and motivation.

One of those conditions is trust, summarised as the expectation that others' future actions will benefit someone else, making one willing to be vulnerable to those actions (Mayer, Davies & Schoorman 1995; Robinson 1996). Trust and psychological safety both include complementary perceptions of risk or vulnerability, as well as choices that minimise negative consequences and potential positive consequences for the organisation. Edmondson's analysed data from a manufacturing company study to show that psychological safety stimulates team learning, which then promotes team performance throughout the hierarchical roles of the organisation (e.g., doctors and nurses sharing experiences can stimulate team performance as a whole). It can also facilitate innovation, e.g., a nurse loses her fear of speaking up stimulates people to share ideas, which results in introducing medical innovations. In order for collective learning to take place, psychological safety needs to be created, for instance by reducing the risks of speaking up, and some type of structure

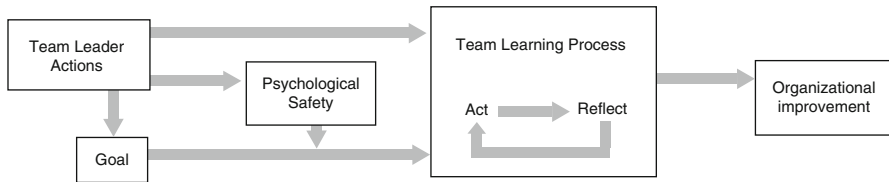


Fig. 36.2 Model of team learning process (Edmondson 2002)

needs to be created for exchanging ideas and initiating action. According to Argyris and Schön (1978) structure can be created (and consequently collective learning can be achieved) through reflection-action, or ‘double-loop-learning’, repetitive cycles of action, reflection, and adjustment or implementation. In order for subsequent action to take place, a compelling shared goal needs to be established first (creating shared understanding) which is also well defined for all team members in order to create reflection-in-action (Hackman 1987).

Edmondson states that psychological safety acts as a moderator in the positive relationship between a compelling goal and team learning. A high level of psychological safety results in a stronger relationship and therefore increases motivation to learn, while a low level causes a weaker relationship and reduction in motivation.

Figure 36.2 illustrates the team learning process, depicting the actions of the team leader that influence the goal, the psychological safety and the team learning process. Psychological safety, however, acts as a moderator between a compelling shared goal and the team learning process, stimulating the effect of this goal on team learning, concluding in organisational improvement.

As a paradox, team learning is achieved by both freedom in behaviour, which is promoted by psychological safety and guidance or structure through deliberate action (West 2000). Managing this paradox and helping to define a shared goal for the team are the main tasks of the team leader. His actions and attitudes define the team learning process (as they influence psychological safety), structure it and communicate the team goal. The leader must also establish structure for the team to ensure reflection-action and corresponding adjustments (Edmondson 2002). Edmondson states that empirical research is needed to test and extend the model illustrated in Fig. 36.2. This model tries to be a supportive framework for team leaders in order to achieve space for innovation while providing structure for learning without rigidity and creating a climate of psychological safety.

36.4.3 Model of Group Continuous Learning (Sessa and London 2006)

In 2006, Sessa and London designed a model for group learning from a different perspective. Senge states in ‘The fifth discipline’ that “team learning is vital because teams, not individuals, are the fundamental learning unit in modern organisation.

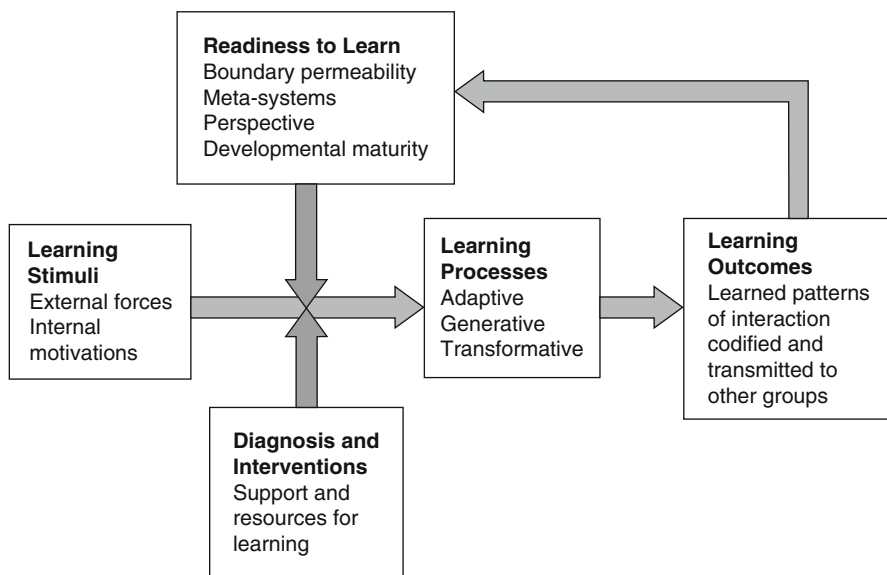


Fig. 36.3 A model of group continuous learning (Sessa and London 2006, p. 653)

This is where the rubber meets the road; unless teams can learn, the organisation cannot learn.” (1990a, p. 10). Team learning appears to be a key driver for individual learning (Slavin 1996; Sweet and Michaelsen 2007), team effectiveness (et al. 1995; Van den Bossche et al. 2006) and organisational learning and innovation (Crossan et al. 1999). Sessa and London (2006) define group learning as “a deepening and broadening of the group’s capabilities in (re)structuring to meet changing conditions, adding and using new skills, knowledge, and attitudes, and becoming an increasingly high performing group through feedback and reflection about its own actions and consequences (p. 652)”. They see the group as a system. From this systemic point of view, group learning is a dynamic system in which learning processes, the conditions that support them, the individuals in the group, and the “behaviour” of the group change as the team learns (Argote et al. 2001; Kazl et al. 1997; Sessa and London 2006).

The model of group continuous learning (Fig. 36.3) described the elements of group learning and their relationships. Learning stimuli and readiness to learn are the two antecedents. Learning stimuli (or triggers) are pressures, demands, challenges, opportunities that arise internally from group leaders or members, or externally from the environment. The stimuli affect the group’s work so that the group cannot continue to work in the same way and be successful (Sessa and London 2006). Readiness to learn determines the stimuli detected by the team and its members, and the responses in which stimuli occur.

Sessa and London (2006) studied the conditions that trigger group learning and variables that contribute to a group’s readiness to learn. Readiness to learn is the

degree to which the group recognises that it needs to change to accomplish its work and has made a decision to take some sort of action. Readiness is a function of three factors: a group's maturity, its boundary permeability and its learning orientation.

Group maturity is the process of moving from a simple collection of individuals towards a complex and integrated system. In a fully integrated and mature group, the group works, learns, and makes decisions as a single unit. To become a holistic system, group members need to develop mutual trust, a shared mental model, a group identity, cohesiveness, and potency.

Teams will be more likely to learn when they are more sensitive to the demands and concerns of others persons, other groups, and the organisation as a whole and when they have appropriate 'boundary permeability', i.e. the ease with which people and resources move in and out of the group (Arrow et al. 2000). Consequently these boundaries need to be sufficiently permeable so that groups can access the resources they need, but not that permeable external input overwhelms the group or causes group resources to be drained from the group (Alderfer 1980). Teams differ in their proactive learning orientation or overall learning propensity (Bunderson and Sutcliffe 2002, 2003). Teams that are high in 'learning orientation' are more ready to learn, they seek opportunities to develop new skills and knowledge and devote time to learning, enjoy and take on challenging assignments from which they can learn, and are willing to test new ideas.

The outcomes of this group learning process are the learned patterns of adaptive, generative, and transformative learning (patterns that become part of the group's mental model). (1) 'Adaptive learning' occurs when the group spontaneously makes changes in the way members interact and the work they do to accommodate environmental demands, pressures, or requests. This often happens without the members knowing that any real changes have been made. (2) 'Generative learning' is proactive learning and applying new skills, knowledge, and information, sharing this with the other members of the group, and as a group, using these skills, knowledge, and information to change the group's goals, tasks, or work methods. It is motivated and regulated by the group itself. Generative learning implies creating and continuously exploring new opportunities that create potential for new sources of growth (Senge 1990a, b). (3) 'Transformative learning' occurs when team structure, tasks or goals are significantly changed to deal with external pressure, respond to opportunities, or find new team directions. Team members critically reflect on personal experience to modify their own beliefs, attitudes and emotional reactions. Consequently it modifies team role perceptions, responsibilities and relationships (Wenger 1998) and results in a deeper sense of understanding (Kegan 2000). Transformative learning can be seen as recreating the group in more fundamental ways.

Group continuous learning is a function of stimuli and readiness to learn (Sessa and London 2006). In the process, the group learns adaptive, generative, and/or transformative patterns of interaction. If the group is successful, it will continue to use adaptive, generative, and transformative interaction patterns when they are needed in the future.

36.4.4 *The Model of Team Learning Beliefs and Behaviours of Van den Bossche et al. (2006)*

Van den Bossche et al. (2006) developed a model based on collaborative learning (as a social process of knowledge building) combined with aspects of the social climate in which learning takes place and by which this learning is influenced. Team learning beliefs and behaviours influencing team effectiveness are stressed in the model.

Collaboration is defined as “the process of building and maintaining a shared conception of a problem or task, distributing responsibility across members of the group, sharing expertise, and mutually constructing and negotiating cognition (Roschelle 1992, in Van den Bossche et al. 2006, p. 495).” Van den Bossche stated that team members share knowledge, achieving mutually shared cognition, which is called “team learning behaviour”. He also considered negotiation to be the key element to determine which interaction and discourse patterns are forms of team learning behaviour. Two team learning processes are further discussed which enables a group perspective: (1) construction and co-construction of meaning, and (2) constructive conflict towards agreement.

Construction of meaning is the process of articulating personal meaning incorporated in the social setting (Stahl 2000), starting when a team member identifies a problem, suggest possible solutions, sharing ideas with fellow team members and therefore inserting meaning. Team members then respond and try to solve the matter, matching ideas and giving feedback. This process can result in co-construction (or collaborative construction), modifying original suggestions by mutual discussion and cooperation (Webb and Palincsar 1996).

Constructive conflict refers to the fact that team members may not always come to a agreement on solving issues, having their own interpretation on the situation with obviously their own solutions they see best. This can result in further elaboration through negotiation of these different opinions. However, these differences may not always guarantee a positive outcome, as elements may be ignored to resolve the matter (De Dreu and Weingart 2003), or these differences may be seen as personal, emotional rejection instead of mere differences in understanding the problem, therefore obstructing productive team behaviour (De Dreu and Weingart 2003). Team benefits will only be achieved if difference in opinions (or meanings) result in further negotiation. Van den Bossche (2006) summarises constructive conflict as “negotiation of the differences in interpretation among team members by arguments and clarifications” (Van den Bossche 2006, p. 496).

Van den Bossche (2006) used quantitative and qualitative methods to come to a joint model of team learning beliefs and behaviours (see Fig. 36.4). Team learning behaviour includes construction, constructive conflict and co-construction, concepts that have been discussed earlier. Beliefs about the interpersonal context include psychological safety (the safety to take interpersonal risks), interdependence (perceived task interdependence in the team), cohesion (social cohesion and task cohesion) and group potency. These beliefs lay on the basis of team learning

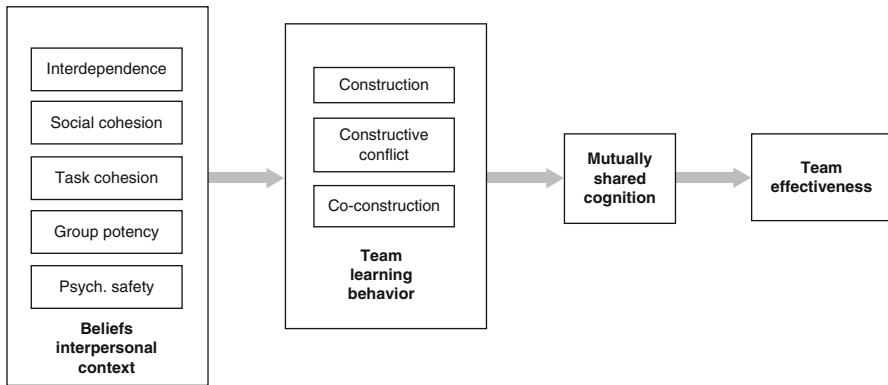


Fig. 36.4 Team learning beliefs and behaviours – model (Van Den Bossche 2006, p. 503)

behaviour and may lead to mutually shared cognition, resulting in increasing team effectiveness.

Results show that perceived team effectiveness is significantly predicted by team learning behaviour, and that mutually shared cognition acts as a mediator between team learning behaviour and team effectiveness. Mutually shared cognition can therefore be identified as a profound learning outcome. Next, it is stated that team members will engage in social (cognitive) processes of team learning behaviour in a specific climate or under specific circumstances, i.e. interdependence, task cohesion, psychological safety and group potency stimulate team members to engage in learning behaviour. Several empirical studies (e.g., Boon et al. 2013; Van den Bossche et al. 2006) have recently replicated and confirmed this model in different contexts using sports teams, police teams, military teams, etc. (see Sect. 36.5).

36.4.5 Integrative Systemic Model for Team Learning (Decuyper et al. 2010)

Compared to research on teamwork, research on team learning progressively lacked integration to a greater extent (Kozłowski and Bell 2008). Therefore Decuyper et al. (2010) co-constructed an integrative systemic, cyclical, and theoretical model that reflects the complexity of team learning and at the same time identifies and structures the complex body of team learning variables. They proposed a framework that consists of three categories: supra-system (environment & organisation), system (team), and subsystems (individuals). The ‘supra-system’ category contains all variables found in literature on team learning that stem from the organisation or the environment of the team, such as the organisational culture, structure, goals and strategies. The ‘system’ category contains variables on the team level, such as task cohesion, psychological safety, interdependence, team culture, and a shared

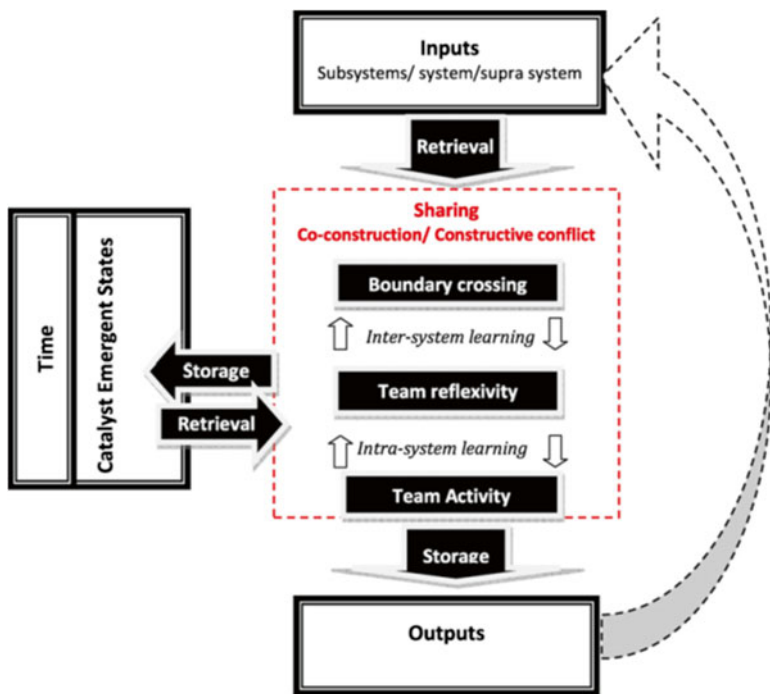


Fig. 36.5 Integrative systematic model for team learning (Decuyper et al. 2010, p. 115)

mental model. The ‘subsystems category’ contains variables that are situated at the level of the individual, such as prior knowledge, individual learning, and motivation.

The model organises and combines team learning processes, outputs, inputs, catalyst emergent states and time-related variables. Figure 36.5 illustrates the integrative systemic model for team learning, clustering the different variables used in research on team learning.

Decuyper et al. (2010) state that input variables from various systems or levels (team members, team, organisation and environment) influence and stimulate the activation of team-level learning processes. Based on literature, eight core categories of team learning processes are derived: sharing, co-construction and constructive conflict; team reflexivity, team activity and boundary crossing; storage and retrieval. These team learning processes can result in adaptive, generative or transformative learning outputs in the team at various dimensions and levels, which can sometimes result in instantaneously noticeable enhanced team performance.

Team learning processes are continuously accompanied and influenced by co-evolving catalyst emergent and time-related variables, as indicated by the intermediate categories in the model. This catalyst emergent states-category contains specific variables that do not embody the trajectory or movement itself, but are closely connected to the team learning process, since they grow from team learning

processes and directly catalyse or reinforce them. This is the reason why changes in the team's capability to act differently often remain unnoticed.

The construction of a joint space for high quality interaction is essential for team learning (Barron 2000; Bouwen 1998; Rowe 2008; Steyaert et al. 1996). Dechant et al. (1993) and Edmondson (1999) mention that team learning consists of several crucial communicative actions: dialogue, feedback, sharing of information, framing, reframing, confrontation, negotiation, etc.

Decuyper et al. (2010) distinguish two levels of team learning. The first and most fundamental level consists of three basic process variables: 'Sharing', 'Co-construction' and 'Constructive conflict'. In order to learn, teams need to engage these three central team learning processes. The second level of team learning process variables consists of the facilitating variables 'team activity', 'team reflexivity', and 'boundary crossing communication'.

Without constructive conflict, co-construction or sharing, there is no team learning. These basic team learning processes describe what happens when teams learn. Although these processes result in change, they do not necessarily lead to improvement (Sessa and London 2008b). The balance between co-construction and constructive conflict empowers a team to learn in any direction within its organisational context. After all, a team can also learn to be unproductive, ineffective, inefficient, etc. Therefore, the second level of team process variables consists of variables that are responsible for its locus and focus: team reflexivity, boundary crossing communication and team activity. These are processes that help teams to learn in the 'right' direction and therefore influence the efficiency and effectiveness of the team learning process. The relationships between the basic variables should be seen as relationships of 'circular causality', rather than relationships of 'linear causality' (Decuyper et al. 2010). Indeed, while the facilitating process variables are directing, the basic process are simultaneously empowering the facilitating processes.

36.4.5.1 Basic Process Variables

Sharing is the process of exchanging opinions, communicating knowledge, creative thoughts or competences between team members, who were previously unaware that these were present in the team (Burke et al. 2008; West 2002). As team members try to listen and use their team member's information to give meaning to the situation, sharing can evolve into co-construction of meaning (Webb and Palincsar 1996). They can also complement, confront and integrate each other's knowledge, competences, opinions and creative thoughts, which facilitates the development of shared mental models, and therefore enriches current personal visions (Senge 1990b).

Co-construction is the mutual process of building meaning by refining, building on, or modifying an original offer in some way (Baker 1994). London et al. (2005) see it as the common quest for and confirmation of interpersonal congruence. Van den Bossche et al. (2006) mention that sharing is an important precondition for co-construction. The open communication of creative thoughts and articulation of personal meaning is the first step for co-construction to take place. Fellow team

members will then actively listen, as they engage in repeated cycles of acknowledging, repeating, paraphrasing, enunciating, questioning, concretising, and completing their shared knowledge, competences, opinions or creative thoughts. In search for interpersonal congruence, team members express, refine and extend (implicitly shared) patterns of thought, language and action (London et al. 2005). This leads to shared knowledge or new meaning that was previously not available to the team (Van den Bossche et al. 2006). For co-construction to actually take place, a similar perspective or a similar reference framework is required from the team members. When teams engage in co-construction, pleasant learning occurs, since the load of the learning energy will be positive.

Constructive conflict is a process of negotiation or dialogue that uncovers diversity in identity, opinion, etc. within a team. It is a conflict or an elaborated discussion that stems from diversity and open communication, and leads to further communication and some kind of temporary agreement (Van den Bossche 2006). Constructive conflict is necessary to come to fundamental changes in thought and behaviour. When teams engage in constructive conflict, unpleasant learning occurs since the load of the learning energy will be mostly negative. After all, general constructive conflicts lead the team members out of their 'comfort-zone'. It activates a certain affective state that liquefies our primitive and more fundamental cognitions and beliefs (Topping and Ehly 2001).

De Dreu and Weingart (2003) show how constructive conflicts are more likely to lead to learning and conceptual advancement, whereas a regular conflict will not. In a regular conflict, team members may, on the one hand, take their differences as a paradox. The paradox might then be resolved by ignoring one of the conflicting elements. A regular conflict, on the other hand, might be experienced as a personal or emotional rejection instead of a difference in the interpretation of the problem. In these cases, the conflict will freeze the mental model instead of facilitating it, due to the lack of constructive conflict. De Dreu and Weingart (2003) argue that the constructiveness of a conflict depends on its nature: affective relationships conflicts versus cognitive/task conflicts.

Van de Vliert and Euwema (1994) focus on the different modes of styles of conflict resolution, which can be subsumed under two dimensions, agreeableness and activeness. The authors conclude that the two dimensions that account for the most variance in social interaction are positive-negative. Avoiding and fighting are generally considered to be negative methods, as they tend to intensify conflicts and they are viewed as more disagreeable. The more positive, prosocial methods, yielding and cooperation, mitigate conflict and are viewed as more agreeable. Also Jehn (1995) finds affective or relational conflicts to be dysfunctional and cognitive or task conflicts to be beneficial for team performance. Van den Bossche et al. (2005) add that it is not the occurrence of task conflicts that facilitates team performance or team learning, but the effort of integrating differences in points of view through constructive conflict. Although the processes construction and constructive conflict are conceptually split in this model, they will often co-exist and reinforce each other in practice (Van den Bossche et al. 2006). As a conclusion, the primary task of any team that wants to learn is the creation of dialogical space.

36.4.5.2 Facilitating Process Variables

Team reflexivity is the process of co-constructing, de-constructing and reconstructing a clear and relatively stable vision or mental model of the ultimate (authentic) and instrumental team goals and methods. Teams only learn effectively when their learning helps them to reach their goals over and over again (Covey 1989). Both situated on the task and the social level, these team objectives and methods steer the other four core processes of team learning in the right direction of authentic goal attainment.

In order to attain the team goals, they need to develop a clear vision on where they stand (current reality), what they want to reach (ultimate team goals), and how they want to reach it (team methods and instrumental team goals). The process of co-constructing, deconstructing and reconstructing a clear and stable vision or mental model of the ultimate and instrumental goals and methods is called team reflexivity. West (2000) defines it as the extent to which group members overtly reflect upon, and communicate about the groups' objectives, strategies and processes and adapt them to current or anticipated circumstances. Arrow et al. (2000), Argyris and Schön (1978), and Sterman (1994) all conceptualise reflexivity within systems in terms of double loop learning. Whereas non-reflective teams only succeed in questioning the extent to which they have achieved the planned goals (single loop learning), reflexive teams also succeed in questioning the actual goals, thereby questioning the rules of the game and the underlying steering variables (double loop learning).

Team activity is the process of team members working together, activating physical and psychological means required for reaching their goals. It is both a process of gradual adaptation of team behaviour in the execution of planned actions as well as a process of making mistakes and having unplanned experiences that disrupt the team functioning. Team activity is about 'learning by doing': teams generally do not only learn explicitly through knowledge transfer or evaluation, but also implicitly throughout team activity. Tacit knowledge, for example, can only be transferred in authentic team activities (Argote 1993). Moreover, team learning may sometimes improve performance without improving the subject's ability to articulate what exactly causes the improvement. Experiment is seen as a special and necessary mode of system activity for effective learning, by testing the groups cognitive hypotheses shared mental models and decisions in practices, or discovering and assessing their impact. Arrow and Cook (2008) state that both planned team activity as chaotic team activity serve the cause of team learning in a different way. Whereas planned team activity cause team members to learn how to execute their planned activities better and faster, a sudden lack of coordination can lead to mistakes and unplanned experience can often trigger constructive conflicts, co-construction and therefore team learning.

Boundary Crossing is a process of communication across borders: between the team and its environment or between team members that represent different groups. Kazl et al. (1997, p. 8) elaborate on team learning and define boundary crossing as: "(...) to seek or give information, views, and ideas through interaction with other individuals or units. Boundaries can be physical, mental or organisational."

From this point of view boundary crossing is a special type of sharing. Without sharing knowledge, competences, opinions or creative ideas across boundaries, teams can neither learn nor work. The effectiveness of a team is not only determined by the team itself but it is also negotiated on the boundaries between the team and its environment.

Research has shown that boundary crossing is related to successful team learning and perceived effectiveness across time (Edmondson 2003a; Hirst and Mann 2004). Brooks (1994) shows that it affects both the ability to bring information into the team and the effective dissemination of learning.

36.4.5.3 Inter-system and Intra-system Learning

Team reflexivity is the central process in effective team learning. When a team engages in team reflexivity, it can lead to two different types of learning. First of all, intra-system team learning refers to a team reflecting on their own past activities, successes and failures and consequently plan modification for future action. Secondly, inter-system learning occurs when a bridge is formed between team learning, individual learning, learning in other teams, organisational learning and learning in an organisational context. This type of learning is bi-directional and happens through boundary crossing: on the one hand a team may reflect on and integrate knowledge, ideas, expertise etc. coming from outside of the team, but on the other hand a team may also plan to disperse what is learned in the team via boundary crossing.

36.4.5.4 Storage and Retrieval

The team learning processes of storage and retrieval lead to the persistence of team learning over time. The results from basic and facilitative team learning processes, such as shared knowledge, ideas, plans, developed procedures, are saved by means of storage and can be retrieved. Wilson et al. (2007 in Decuyper et al. 2010) use the term 'software', which means the immaterial repositories of storage such as the memory of an individual in a team, shared mental models, and the transactive memory system. The hardware of a team is of material nature, such as notes, computer databases, bulletin boards, expert systems, and artefacts.

36.5 Empirical Evidence for the Antecedents and Outcomes of Team Learning

Different researchers empirically investigated different types of teams within organisational settings. In order to make a distinction between the different types of teams and their characteristics different researchers, like Sundström et al. (1990)

or Cohen and Bailey (1997) created a team type typology. Most existing typologies are slightly different but the categories they use are mostly overlapping. The differences and parallels between the typologies of Cohen and Bailey (1997) and Sundström et al. (1990) can be considered as a good example of the connections between the different typologies. Cohen and Bailey (1997) made a distinction between four different types of teams, namely work teams, parallel teams, management teams and project teams. Sundström et al. (1990) made a comparable distinction between advice and involvement teams (e.g. Cohen and Bailey's parallel teams), production and service teams (e.g. Cohen and Bailey's work teams), project and development teams (e.g. Cohen and Bailey's project teams), and as a last category they added a category different from management teams, namely action and negotiation teams (Cohen and Bailey 1997). A few years later, Devine (2002) created a typology that can be seen as an integrative typology that consists out of 14 different types of organisational workgroups based on seven underlying dimensions, namely fundamental work cycle, physical ability requirements needed from team members to fulfil the task, temporal duration of group existence, task structure, active resistance against accomplishing teams goal, hardware dependence, and health risk. Although all the teams that are classified in the typology can be described using the general definition of a team described earlier in this chapter, these 14 types of teams differ in a number of ways. When creating a general model of team learning one could suspect that this general model is not a perfect fit for all the different types of teams that exist. A lot of the 'noise' found in small group research can be attributed to sampling error but most of this noise can be attributed to the differences between the different types of teams (Devine 2002). When we look at studies that focus on different types of teams, we can see that due to the team characteristics, that are specific to the different types of teams, the variables that shape the interpersonal context has a slightly different influence on the team learning behaviours depending on the type of team that is studied.

Van den Bossche et al. (2006) tested their Team Learning Beliefs and Behaviours model on 75 student teams. These student teams had the mission to advise an organisation on its strategy, as a consequence they can be classified under advisory workgroups. Advisory workgroups are short-term, cross-functional teams that operate outside of the formal structure of an organisation. They have a specific goal in terms of e.g. formulating advise concerning the sociotechnical systems of the organisations or to improve organisational effectiveness (Devine 2002). Van den Bossche et al. (2006) found, in line with Roschelle and Teasley (1995), that merely gathering a number of people is not sufficient to create team learning behaviours, but that an interpersonal context is needed for these people to share their understanding. Van den Bossche et al. (2006) also found that certain aspects of the interpersonal context are more important than others to stimulate team learning behaviour. Psychological safety was found to have a strong relationship with team learning behaviour. It seems important for team members to be able to feel as if they can discuss and elaborate unrestrained on their opinion, for learning to take place within the context of a team (Edmondson 1999). The other

variables included in the model, group potency, task cohesion, and interdependence also play an important role.

These findings are confirmed by a study in police- and fire teams (Boon et al. 2013). Police- and fireman teams can be classified under response workgroup. The collective team task of these teams is to rescue and protect. It is behavioural in nature and requires team members to scan a situation, decide upon an appropriate action and then perform the action coordinated and quickly (Devine 2002). In addition, the environment in which they operated differs considerably from the student environment in the research of Van den Bossche et al. (2006). Police- and firemen teams often have to act in high-risk environments and team members have to be sure that they can trust each other (Devine 2002). We found that the Team Learning Beliefs and Behaviours model (Van den Bossche et al. 2006) generally applies to the police- and firemen teams in the study. We also found that, although social cohesion does not predict team learning behaviours, it is significantly related to team effectiveness (Boon et al. 2013). These findings can be explained by the specific context in which these teams operate: for example, it is important that team members feel like the team 'has their back' and supports them during dangerous interventions. Another important conclusion of this research is the finding that firemen teams score higher on group potency, self-efficacy and team effectiveness than police teams. This finding confirms that difference in processes or constructs depend on the team type that is investigated.

Veestraeten et al. (2014) tested the Team Learning Beliefs and Behaviours model on military teams. According to Devine (2002) military workgroups are "*small, formal units that use lethal force (or the threat of it) to accomplish a variety of tasks associated with maintaining domestic order and ensuring national security (e.g., aircraft crews and infantry squads)*" (p. 303). They act in physically demanding and hostile situations. Typically for a military environment is a hierarchal organisational structure within which orders have to be followed and executed. Nevertheless, battles can be very ambiguous, ill structured and chaotic, in addition the given orders do not tend to last very long. As a consequence, there is a high need for communication and collaboration among team members (Devine 2002). This study also confirmed the Team Learning Beliefs and Behaviours model of Van den Bossche et al. (2006). Unlike the findings for other team types in previous studies social cohesion does seem to have, next to psychological safety and group potency, a direct significant influence on team learning behaviours in military teams. According to Veestraeten et al. several other researchers drew similar conclusions concerning the group comradeship within military teams. In military teams, social cohesion is a predictor for motivational factors and performance (Millward et al. 2009), it provides social support and is important to reduce the negative effects of team-level stressors often present in military contexts (Moldjord et al. 2003). However too much social cohesion could do more harm than good for military teams but also for other type of teams (Van den Bossche et al. 2006). For military teams, it could have a pernicious influence on team performance and decision quality due to the phenomenon of passive and uncritical 'groupthink' (Beck and Pierce 1996).

Lynn et al. (1999) uncovered several factors that could increase the learning ability of new product teams. They studied the learning practices of 95 new product development teams. These teams can be classified under the term design workgroup (Devine 2002) and they usually have an assignment that requires them to be innovative and creative. Design teams are temporary and are composed cross-functionally. The product they have to deliver is tangible and most of the times these teams have a clear idea about what they have to create but not about how they have to do it. Lynn et al. (1999) defined team learning as a construct comprised of information acquisition and information implementation. They found that the practice of reviewing knowledge captured by team members is a significant predictor for information acquisition. Reviewing of knowledge is comparable with the team learning behaviour 'sharing' as defined by Decuyper et al. (2010). They also found that an NPD process, a framework to help new product development teams reach their goals, is a significant predictor for information implementation. For a new product development team to be able to put information into action a NPD process seems necessary. Lynn et al. (1999) warn against a too rigorous process because this could prevent certain competencies to come to the surface and distract from a successful NPD process. Stated differently, processes like co-construction and constructive conflict should have a chance to manifest and that is not possible if the processes are too strictly delineated. To conclude, Lynn et al. (1999) also found that the presence of these learning constructs (information acquisition and information implementation) the speed with which the product is brought to the market and new product success.

Edmondson (2003a) focussed her research on operation room teams. She classifies them under action teams (Sundström et al. 1990). "Action teams are defined as teams in which members with specialised skills must improvise and coordinate their actions in intense, unpredictable situations" (Sundström et al. 1990, p. 1421). According to the typology of Devine (2002) however, these operation teams can be classified under medical teams. They have the task to diagnose the physical condition of patients and to take appropriate steps to improve their health under severe time constraints and with the health of the patient at risk when choosing a wrong procedure. Their task is usually very structured due to standardised diagnostic protocols and operating procedures. Edmondson (2003a) conceptualises team learning as the learning of new tasks and coordination routines. Team learning processes are defined 'the ease of speaking up', 'boundary spanning' and 'practice/reflection'. The ease of speaking up seems to be an important factor to explain learning outcomes (in this case the implementation of a new technique). This concept is very similar to the variable psychological safety: it also stresses the need to be able to reflect on differences in opinion, questions and ideas in the team in order to create experimentation and a shared idea of what works and what does not work in order to be able to learn and innovate as a team (Edmondson 2003a). Boundary spanning, or communication with external parties, leads to implementation success of the new learned technique through communication. The team leader plays an important role in forming a context where ease of speaking up and boundary spanning are high (Edmondson 2003a).

36.6 Conclusion

The importance of working and learning together in modern organisations and in education has been increasingly stressed the passed decades. Collaborative learning in the broad sense of learning with and from others and its impact has been investigated extensively in (higher) education whereas team-learning, in the sense that learners in a team are also interdependent in their task and share responsibility for outcomes and are seen by others as a social entity embedded in one or more larger social system, has received more attention in professional organisations.

Looking at the team-learning studies it seems that in all the teams, regardless of the type, the variable psychological safety plays an important role in the team learning process. Edmondson (1999) was the first researcher to address the importance of psychological safety for the functioning of teams. The presence of psychological safety in teams indicates that the beliefs that team members are safe to speak up, to admit their mistakes and to express their concerns are present in the team. The elimination of these concerns is necessary, as the studies discussed above show, in order for team learning behaviours such as experimentation, constructive conflict, sharing, trial and error, seeking help, questioning current team practices to occur (Decuyper et al. 2010).

Another notable variable is social cohesion. Mullen and Copper (1994) conducted a meta-analytic integration of the relation between cohesion and performance in teams. They found a strong relation that was mainly attributable to the commitment to the task (task cohesion) and not to the interpersonal relationships in teams (social cohesion) (Mullen and Copper 1994). Based on their conclusion Van den Bossche et al. (2006) hypothesised that social cohesion, in contrast to task cohesion, would not be related to team learning behaviour because the relationship between these two constructs is complex. Although they confirmed their hypothesis, this assumption does not appear to apply to all types of teams. In police and firemen teams social cohesion is correlated with team performance and in military teams it is associated with team learning behaviours. As already stated above this could be attributed to the specific characteristics of the team task (Veestraeten et al. 2014). Teams in the latter study have to work in physically dangerous and low structured circumstances where fast reaction and coordination is necessary. To be able to work as a good functioning unit, these team members have to be able to trust each other and apart from the contribution of the presence of psychological safety and task cohesion, the presence of social cohesion is important for these types of teams. It is up to future research to resolve more of the key-elements of successful team learning.

For us, this future research can only advance in breaking ways if we cross boundaries of disciplines and areas. Having ourselves started studying collaborative learning in universities and later on team learning in companies, we experienced how much we did learn from the 'other' world and from other disciplines. We hope this crossing and collaboration between researchers will increase, both in doing collaborative research, in exchange of researchers and in collaborative writing in different disciplinary scientific journals.

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Chapter 37

Teams, Communities of Practice, and Knowledge Networks as Locations for Learning Professional Practice

Victoria J. Marsick, Andrew K. Shiotani, and Martha A. Gephart

Abstract In this chapter, we review research to better understand how teams, communities of practice, and knowledge networks serve as locations for learning professional practice. We focus on the ties and relationships that connect the people who are actually doing the learning. The lines have blurred between individual learning, and the groups and communities people join to collaborate to reach goals and solve problems. Individual motivation, learning, and performance are the starting point; but such learning is often intrinsically connected to social learning, informal, and embedded in unique work contexts. A key question is how do different kinds of work arrangements and relationships lead to not only an overall enhancement of worker competencies and stocks of knowledge but organizational capabilities to produce integrated solutions responsive to evolving problem situations. Our review suggests a focus today on process rather than structure, which implies an inherently dynamic *process* of forming, renewing, and reshaping collective and reciprocal relationships in ways that respond to shifting needs and problems.

Keywords Informal learning • Teams • Communities of practice • Knowledge networks

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Professionals are highly educated, often-credentialed individuals who have mastered a body of expertise. Benveniste (1987) described differences between professional learning and that of other workplace learners that hold today:

Professionals have learned to think independently. They are more likely to question orders rather than execute them with obedience. They draw on an extensive knowledge base which they update by reading, interacting with colleagues ... and participating in ... continuing education offerings. Professionals monitor their own collective practice ... [and] sometimes must be independently certified or credentialed. Professionals want recognition by their peers more than the organization ... [and] 'are not trained to espouse a narrow organizational perspective' and is from Benveniste 1987, p. 49 as cited by Marsick and Watkins 1990, p. 44.

Professionals, then, could be described, historically, as independent learners. They fit Kegan's (1994) conceptualization of self-authoring adults, who have a developed mindset as to how their professional work is best understood and carried out that frames their understanding and influences their judgments and actions they take.

In this chapter we examine ways that professionals shape meaning and learn collaboratively with others at work. Professionals, we argue here, learn frequently as individuals, but they also learn through collaboration with others. Solutions to work challenges today often require bringing together several bodies of deep expertise to address complex problems with no known solutions. Heifetz (1994) differentiated between technical and adaptive problems—the former with known, tested solutions and the latter, by contrast, with no known or tested answers. Professional collaboration today is being driven by the need to draw on more than one body of deep knowledge to solve adaptive problems. Decisions to adaptive problems require action in complex situations despite insufficient information about either the problem or the likely consequences of actions taken.

Solomon (2010) emphasized the growing need for collaborative professional learning in the health professions at the Canadian Physiotherapy Association conference in 2009. Solomon defined inter-professional collaboration as "interaction between two or more professions, organized into a common effort to address common issues, with the participation of the patient." She defined inter-professional education as what happens "when two or more professionals learn with, from, and about each other to improve collaboration and the quality of care" (Centre for Advancement of Interprofessional Education webpage) and further described such learning as inclusive of "all learning in academic and clinical settings, before and after qualification" (Solomon 2010, p. 47).

Another field in which collaborative learning has risen to the fore is education. Professional learning communities (PLCs) have grown rapidly to support groups of teachers who learn together by examining student data to improve teaching, inquire into effective practices, encourage classroom-based experimentation, and foster reflective practice and inquiry (Dufour 2004; Hord and Sommers 2007). While all professions may not engage in collaborative learning, the health and educational professions point to a phenomenon of growing interest that can benefit from reviewing research on learning in groups.

Based on extensive research with a variety of professionals, Eraut (2004) and his colleagues describe the way in which professionals adapt what they know to new

circumstances, often through interaction with colleagues or clients as they jointly solve problems. They emphasize the way in which local conditions affect learning. People learn better with the right balance of challenge and support, which in turn supports their confidence in proactively taking on challenges. The social environment is critical to success. People learn best at work when they are committed and get good feedback from colleagues as well as managers—factors that are enhanced by “social inclusion in teams and by appreciating the value of the work for clients and for the workers themselves” (Ibid, p. 24).

In this chapter, we review research to better understand how groups of different kinds serve as structures for both work and for learning in professional practice. We describe, in particular, *collective learning*, that is, shared learning and knowledge among professionals that may occur through different collaborative work structures. We focus on the ties and relationships that connect the people who are actually doing the learning.

Since the 1980s studies have increasingly documented collective learning in organizations—identifying different processes and dynamics that leaders and managers themselves have increasingly taken into account as they structure work processes and routines. Though organizations have encouraged and institutionalized different kinds of groups to realize strategic goals and objectives, three different kinds of structures—*teams*, *communities of practice*, and *knowledge networks*—have attracted the most attention from organizational researchers and managers as important mechanisms for supporting both learning and performance.

A caveat is in order here. Organizational research on groups and collective learning is still an emerging field. As such, it has faced a number of challenges or difficulties, as scholars continue to search for adequate methods to identify and explain sources of variation in group performance. What makes one kind of group or collective arrangement more effective than others in promoting learning or in linking learning to performance? Research has been complicated, moreover, by the fact that organizations often use the same labels to refer to otherwise distinct groups or collective activities, making it difficult to draw meaningful comparisons or apply consistent measures across different situations and contexts. Nevertheless, much is known that can guide professionals in using opportunities for collective learning to catalyze performance.

37.1 Teams

One of the most fertile areas of research has been on *teams*, or groups tasked with specific objectives and priorities. Organizational leaders, managers, professionals and employees have become widely accustomed to thinking of and working in teams to manage a variety of both ordinary and critical situations and processes. Teams afford managers greater degrees of flexibility and freedom as they seek to respond to increasingly competitive and turbulent business environments. Furthermore, teams are held to offer important learning benefits by bringing together

individuals with different skills and experience, as well as information and knowledge, to work collectively on tasks in ways that may help organizations respond to challenges while identifying new opportunities.

Research on team learning is growing. Edmondson et al. (2007) identify three major research streams that have emerged in the peer-reviewed literature on team-based learning. Although not fully exhaustive of all of the available research, the three streams provide a rounded picture of issues and problems in investigating team learning:

- Outcome improvement: How do teams achieve cost or time savings or other kinds of improvements in work outcomes?
- Task mastery: How do teams master complex new tasks and challenges?
- Group process: What kinds of group interactions, behaviors, and orientations are likely to encourage links among learning, performance, and innovation?

While not solely focused on professional teams, studies of outcome improvement and group process are discussed here in more depth because they shed light on the dynamics of collaborative professional learning. Task mastery studies are not elaborated here because studies focus on routine tasks such as assembling transistor radios that seem less relevant to professionals.

37.1.1 Team Learning and Outcome Improvement

This strand focuses on how learning curves in teams can lead to improvements in organizational outcomes. These improvements are usually measured by recording quantitative gains in efficiency in carrying out tasks, such as cost or time savings.

Case studies carried out in this research stream indicate the importance of *team stability* as a key factor that encourages team learning, so that team members are better able to acquire needed skills and behaviors to improve and perform more effectively: “Team members that stayed together, improved more quickly” (Edmondson et al. 2007, p. 216) Teams whose members gained experience and familiarity working with one another were able to learn more quickly from one another.

At the same time however, the value of team stability may be over-emphasized, especially in modern organizational and professional contexts where work environments display a high level of uncertainty and instability. For this reason, in recent research Edmondson (2012) has emphasized the need to move beyond ‘teams’ as static entities by focusing instead on ‘teaming.’ Teaming points to overlapping and interdependent processes of problem-solving and innovating; it requires skills that promote back-and-forth communication, rapid integration of new ideas and experiences, and joint efforts.

In addition to team stability, however, team collocation, task characteristics, and team coordination and management were also found to contribute to efficient learning curves. For instance, learning curves appear to vary depending on whether *tacit*

and implicit rather than *codified* or explicit knowledge is involved (Edmondson et al. 2007). The former is often dependent on personal, professional, or individual knowledge and experience and tied to patterns of face-to-face interaction. The latter, however, is less dependent on individual actors and is therefore more easily transmitted across different organizational units and sites. Tacit knowledge may be key when professionals bring unique knowledge to bear in collaborative solution of new problems for which there are no clear solutions. Codified or explicit knowledge, developed collaboratively, can be embedded in checklists and other knowledge sharing mechanisms so that the fruits of invention are widely disseminated.

Where efficiency gains such as cost or time reductions are dependent on tacit knowledge, learning curves seem to vary considerably, while codified knowledge seems to lead to more uniform learning curves. Thus, to take one example, a case study examining the adoption of a certain type of surgical procedure found that codified knowledge led to uniform learning curves across different surgical teams with respect to breadth of use of the procedure (Edmondson et al. 2003). However, in those dimensions where tacit knowledge was important (which in this particular case was relevant to reductions in surgical procedure time) learning curves varied considerably across teams

In a similar vein, team learning is often influenced by how teams are managed and coordinated. Research indicates that teams experience reductions in project start-up times when they engage in deliberate and intensive knowledge-sharing among individuals with different functional responsibilities and expertise. Do managers of professional teams encourage sharing of ideas across teams, which would promote additional learning benefits beyond those brought by team stability and experience? Differences in how professionals communicate and share information thus affect how effectively they learn, as well as how efficiently they are able to share useful knowledge and thereby achieve time and cost savings.

37.1.2 Team Learning and Group Processes

This stream of research has focused on the dynamics of *team learning*—differentiated from good group dynamics and *teamwork*. Teams can *work together* well enough together to perform tasks but that does not mean they hold knowledge in common. When the team also *learns together*, members create and hold new knowledge collectively as a unit. Kasl et al. (1997) studied both a cross-section of teams in an organization undergoing widespread change, and subsequently within the IT unit of a paper manufacturing company that had decided to reorganize as self-managed teams. Using a grounded theory approach, they identified five learning processes related to thinking and action: framing of one's initial understandings, crossing boundaries to share views, experimenting to test new thinking, integrating perspectives as divergent views are synthesized, and reframing to transform initial perceptions. Kasl et al. (1997) also identified group conditions that affect the ability of teams to learn and organizational conditions that affect the degree to which team

learning outcomes are shared more widely in the organization. These conditions vary in different contexts, but statistical analysis undertaken to create a *Team Learning Survey* suggests that appreciation of teamwork, freedom of individual expression, and adherence to shared operating principles greatly improve team learning in many contexts.

Kasl et al. (Ibid.) found that the extent of shared team learning can vary in a team. Fragmented learning, for instance, occurs when individual team members learn on their own while carrying out, and coordinating, their team's tasks and assignments. Pooled learning emerges when several people in a team share information and develop new insights in pursuing solutions to common challenges. Synergistic learning occurs when group members engage one another in a dynamic process of framing and reframing, that develops shared schemes of meaning and allows for group effort and individual learning to interpenetrate in a common framework. Though teams ideally mature from fragmented to pooled to synergistic types of learning, an evolutionary trajectory is not necessarily guaranteed.

This team learning process framework was validated and extended in several replication studies (Gavan 1996; John 1995; Oxford 1998); and has been used to examine team learning in cross-cultural or global team contexts (Chang 2013; Ndletynana 2005; Stull 2008). This team learning model emphasizes crossing boundaries of various kinds, including professional expertise, to share information, inquire into different perspectives held by team members, and integrate thinking to create new ways of understanding and acting on a common problem toward shared goals—as would likely be needed in collaborative professional learning.

Other research has drawn attention to managerial and contextual factors affecting communication dynamics and interaction patterns among team members. Edmondson (1999), for example, found that team learning behavior helped ensure that good team leadership and design resulted in desired performance. Teams that encouraged learning behaviors both within in-group processes (such as in team meetings) and in boundary-spanning activities (such as in team member outreach to external sources of ideas, knowledge, or information) tended to have managers or leaders who de-emphasized power and status differentials in favor of participation, risk-taking, and 'speaking up' (Edmondson 2003). In contrast, teams whose members found managerial behaviors to be intimidating or threatening were less likely to engage in learning behaviors such as sharing information and new insights or proposing alternative courses of action (Sarin and McDermott 2003; Edmondson 2012). Eraut's (2004) research on informal professional learning in workplace settings found, similarly, that learning was enhanced when professionals felt confident that meeting workplace challenges would be supported by a positive workplace climate for which management and leadership are primarily responsible. The absence of adequate challenge and encouragement and support from management, in turn, undermines confidence and motivation to learn.

A number of contextual variables such as team size, experience, and diversity may have an impact on relevant group processes. For instance, Sarin and McDermott (2003) studied innovation and learning styles in 52 high-tech projects, and found that team size is negatively correlated with learning, probably owing to increased

coordination and communication difficulties. However, optimal team size may depend on circumstances and, therefore, be difficult to specify in a general manner.

Teams, of course, benefit when common learning goals are articulated. Additionally, team effectiveness may be supported by a learning orientation that encourages team members to seek out new skills, knowledge, and competencies available from both internal and external sources. However, caution is needed on this point, as learning needs may differ for high- versus low-experience teams (Pisano et al. 2001). For instance, field research indicates that high-experience teams may benefit from targeted learning but suffer in their performance if required to engage in learning efforts that turn out to be unnecessary. In this connection, Haas and Hansen (2005), studying outcomes of 182 sales proposals made by teams in a management consulting company, argue that highly experienced teams in competitive bid situations are actually negatively affected by extensive use of their company's codified knowledge resources (e.g., electronic documents and database resources), perhaps because such knowledge was redundant, inappropriate, or outdated relative to the task requirements implicated in the bid situation. Only when teams were inexperienced and bid situations less competitive did the use of such resources positively affect performance.

Finally, an additional consideration is whether teams encourage their members to develop a sense of team identity or emotional identification with the team. Team identification can encourage learning at least indirectly, by moderating fault lines separating demographic or expertise subgroups. Creating a sense of team identity—in conjunction with other processes such as leadership style, task characteristics, and team learning orientation—may be helpful in encouraging teams to induce communication and collaboration across subgroup boundaries.

While research on team climate and team leadership is well-established, more recent research into group process has attempted to identify specific team learning *behaviors* or orientations that encourage innovation. Evidence suggests that there are learning benefits for teams that establish cycles of action and reflection, in which teams attempt to capture the 'lessons of experience' and incorporate them into future work processes through various means, such as systematization and codification (Edmondson et al. 2007). This reflective learning process is common among professionals (Schön 1983). Benefits may accrue even if teams adopt different learning styles. Case studies indicate, for instance, that certain teams are responsible for engaging in incremental learning aimed at improving existing processes or proven production technologies, while others concentrate on radical learning directed at innovation. Edmondson (2002), in a study of 12 manufacturing company teams, demonstrates that both types of teams benefited by linking action to reflection, even if the tension between 'incremental' and 'radical' learning suggests potential conflicts and trade-offs between learning orientations aimed at experimentation and innovation and those aimed at more immediate gains in efficiency and performance.

March's distinction between 'exploration' and 'exploitation' is relevant here (March 1991; see also Holmqvist 2004). The former refers to learning aimed at innovation and risk-taking, while the latter points to learning concerned with

improving and refining established knowledge and technologies. Both kinds of learning are valuable for professionals. Exploitation draws attention to continuous improvement within known professional knowledge frameworks. Exploration focuses on securing longer-term competitiveness through innovation and reframing professional ways of knowing, which presents risks of failure. Wong (2004), conducting research on 73 groups across different industries, found that local learning (learning from within the group) predicted efficiency gains, while distal learning (learning by seeking ideas, information, and knowledge from parties outside of the group) predicted innovativeness of group activities. Therefore, he recommends local learning orientations for teams responsible for increasing efficiency, and distal learning for teams responsible for innovation. In either case, investments in innovation and experimentation carry risks of failure, but these risks must be acknowledged and borne in order to generate learning opportunities that can lead to future performance gains. A critical element of group process therefore is the willingness of leaders to cultivate appropriate group behaviors and mindsets in light of this tension between learning and performance (Singer and Edmondson 2006).

37.1.3 Virtual Teams

With the advent of increasingly sophisticated communications technologies, organizations have started to resort to hybrid and virtual teams to manage and coordinate different kinds of processes, including R&D and product innovation. In health settings, for example, technology enables diagnoses and treatment consultations to be undertaken virtually, at a distance. The learning requirements of such teams—as well as their effectiveness in contrast to more traditional face-to-face team formats and designs—remains a nascent but burgeoning area of research, with questions of team identification and collaboration styles being an especially prominent dimension of investigation (Fiol and O'Connor 2005). Since virtual teams often link members within and across countries, it is worthwhile remembering that ‘team’ concepts are highly susceptible to variations in national culture, linguistic practice, and metaphor, and that these variations may create barriers as well as facilitate learning (Gibson and Zellmer-Bruhn 2001; Ndletynana 2005; Stull 2008).

Gibson and Gibbs (2006) found, based on in-depth field research into virtual teams (including interviews with an initial round of 14 teams across different industries, and a second round of 56 aerospace design teams) that geographic dispersion, electronic dependence, structural dynamism (i.e., fluidity of team membership and management), and national diversity were potential barriers that virtual teams must manage. Each of these factors pose independent challenges to professional learning insofar as they reduce shared contexts for interpreting and evaluating incoming streams of information and observations, while increasing uncertainty regarding coordination, political support, and cultural understanding. They found, however, that teams that encourage a psychologically safe communication climate can mitigate the effects of these factors. In brief, teams that encourage open communication,

risk-taking, and mutual respect and trust manage to elicit more frequent exchanges of information and opinion among team members, including informal outreach and feedback as well as cooperative problem-solving. Such teams are able to leverage a safe climate, generating incentives for team members to develop a shared history of working together and aiding in team integration. Communication of this kind may be especially difficult in inter-professional collaboration due to different knowledge bases as well as rivalry or turf wars (Solomon 2010).

37.2 Communities of Practice

The concept of *communities of practice* (CoP) was introduced into the organizational learning literature during the late 1980s and early 1990s, with the publication of seminal contributions by Lave and Wenger (1991), Brown and Duguid (1991), and others. It has since been taken up by numerous other scholars, researchers, and practitioners, although Wenger (1999; see also Wenger et al. 2002) has remained a leading figure in its subsequent development. Communities of Practice have become central mechanisms for professional learning of teachers (Dufour 2004; Hord and Sommers 2007), though it is not clear how widespread CoPs are in other professions. Ferlie et al. (2005), for example, argue from two qualitative health care studies in the U.K. that “Social and cognitive boundaries between different professions retard spread [of innovations], as individual professionals operate within unidisciplinary communities of practice” (p. 117). Deep disciplinary mental models could interfere with willing consideration of alternative views posed by professionals from disciplines other than one’s own.

Early discussions of CoPs drew attention to discrepancies between ‘official’ or ‘canonical’ organizational procedure and the *actual* practices of workers and employees engaged in the tasks of solving problems and seeking ways of accomplishing goals and objectives more effectively. This led to the insight that much of the ‘knowledge’ reflected in organizations’ official operating procedures, training programs, manuals, blueprints, workflow charts, and so on, captured formal, explicit, codified knowledge, but not the rich, living, changing tacit knowledge gained as people interact and learn from one another (Brown and Duguid 1991, 2001). Professionals and other employees at work do not respond to problems in individual or isolated fashion by mechanically applying knowledge acquired through training or encoded in manuals. When they encounter new challenges or circumstances, they draw on prior experience to understand the new situation, but they also talk with colleagues to adjust what they know or seek new insights appropriate to the new context (Eraut 2004). Such responses typically do not follow pre-ordained scripts, but are frequently improvised. Impromptu meetings and hallway conversations, back-and-forth exchanges, shared observations, and the like are the principal vehicles through which such learning takes place. The communities of practice concept was introduced, therefore, to capture this socially embedded and locally emergent quality of collective or group learning.

The CoP concept gained traction because it drew attention to the value of workers' tacitly-held knowledge as well as collective and practical experience as drivers of learning and performance. As the benefits of CoPs have become increasingly apparent, however, organizations have attempted to determine whether they can utilize CoPs in a more directed fashion to guide knowledge creation and knowledge management strategies. Early academic discussions of CoPs tended to portray them as quasi-organic entities emerging almost spontaneously out of the thick welter of interactions and exchanges between communities of like-minded and similarly-situated practitioners. However, it has remained an open question whether or not CoPs can be intentionally created and implemented from the *top-down*—and if so, whether they can be supervised or managed, and their impacts on performance measured without undermining their learning value for individual members. No definitive answer is available from the literature; even partisan advocates of CoPs acknowledge that measurement issues, in particular, remain complicated and difficult (Archibald and McDermott 2008; Hildreth and Kimble 2004; Wenger 1999).

To some extent, recent research into CoPs has attempted to remedy these shortcomings by implementing a variety of familiar monitoring and evaluation methods, including participant observation of learning activities (such as CoP meetings and face-to-face interactions), surveys and focus groups, and statistical analyses of access or participation in CoP resources, such as learning portals. Moreover, a range of case studies (e.g., Hildreth and Kimble 2004) have led to a number of consistent or overlapping findings. Research consistently indicates that direct control or 'heavy' supervision of CoP activities may undermine CoP sustainability. However, organizations that adopt a 'light touch' approach, emphasizing strategic guidance rather than direct supervision, are more likely to succeed. This is highly consistent with professional norms and preferences in work and learning. Chances for success are also further enhanced if organizations are willing to offer dedicated resources to CoP growth (including, quite importantly, time for members to participate), as well as official recognition of the worth and value of CoP learning activities.

The key point is that organizational leaders must recognize that CoP cultures require time and resources in order to take root. Excessive supervision, overly-explicit goals, and onerous expectations and assignments generate artificially restricted exchanges and interactions stripped of genuine learning value (Bishop et al. 2008; Lesser and Fontaine 2004; Thompson 2005). However, as Thompson (2005) points out, it may be useful to continue research to specify upper and lower bounds on direct organizational involvement in creating and fostering CoPs. Moreover, he argues, CoP activities are more likely to be sustainable if members also establish epistemic parameters. By this he means that they must at least tacitly recognize certain ideas as 'boundary concepts' around which discussion can and ought to proceed, although this poses the risk of discussion becoming too specialized and inward-looking, which may lead to a loss of meaning. CoPs thus consistently face the problem of managing or negotiating tensions between levels of formality and informality, as well as greater and lesser degrees of direction and explicitness.

Even if direct supervision or excessive managerial control may undermine the benefits of CoPs, CoP leadership remains an important variable in determining longer-term success. Leaders have an instrumental role in generating and sustaining enthusiasm, motivation, and commitment among CoP members. CoP leaders also serve as important points of connection between CoP members and the larger organizational context. For instance, leaders communicate with other senior leaders, professionals, and managers to ensure that learning objectives are aligned with broader organizational goals. Moreover, as Bishop et al. (2008) demonstrate in their 'best-practices' study of CoPs in the construction and engineering design industries, CoPs benefit from sponsors or champions in senior positions willing to offer strategic guidance while utilizing their authority to help secure legitimacy and resources for CoP activity and growth. Additionally, organizations seemed to benefit when CoP participation was recognized and institutionalized as a part of work and professional development. Professionals, who often enjoy greater autonomy in their roles at work, could structure work meetings and other interactions to take advantage of CoP-based learning opportunities.

Archibald and McDermott (2008) benchmarked CoPs through large-scale surveys across different industries. Their initial findings, based on a survey of 52 CoPs in 10 organizations, indicate the following factors were important to productive impact:

- Significant funding for face-to-face events
- CoP activities addressing business issues
- CoP leaders receiving training in community leadership
- Sponsors with high levels of expectations
- Members engaged in developing good practice
- CoPs improving the usefulness of IT tools provided
- Clearly stated goals
- CoP solving employees' daily work challenges
- Leaders with sufficient time to perform the role.

Acknowledging that these factors were already identified by previous qualitative research and case study examples, Archibald and McDermott nevertheless attempt to add a measurable, quantitative dimension, helping to provide further direction to organization leaders seeking to take advantage of this format for facilitating learning. These studies were not conducted with a sole focus on professionals, who are often described as intrinsically motivated. Nonetheless, given that many professionals function within organizational boundaries, some of these factors are likely to benefit professional CoPs.

37.2.1 Virtual Communities of Practice

While Archibald and McDermott emphasize the importance of face-to-face interaction as a key benchmark in predicting CoP sustainability and effectiveness, a recent focus of research in the CoP literature has concentrated on examining the viability

of on-line or virtual CoPs. The digital era has led to increasing use and familiarity with sophisticated information and communication technologies (ICT), such as on-line portals and discussion boards, wikis, blogs, virtual workspaces and file-sharing platforms, social media and instant messaging, and so on. Professionals use ICT on the job for research and problem solving as much or more than many other knowledge workers.

These developments stand in an interesting, if somewhat problematic, relation to traditional concepts of CoPs, which interpreted learning, working, and innovating (Brown and Duguid 1991) as locally situated practices mediated by face-to-face interaction. However, given that workplace discussions are increasingly filtered through virtual communication, the idea of using ICT to generate CoP-like communication and interaction is no longer unusual. To this end, researchers have been attempting to identify conditions leading to virtual CoP success. Dubé et al. (2005) conducted a qualitative study of 18 virtual CoPs across 14 organizations, and found that (1) overall organizational environment and climate, (2) topic relevance to everyday work concerns, and (3) formal recognition of CoP roles and activities were key factors in explaining the likelihood of successful virtual CoP launches. Virtual CoPs, as with more traditional CoPs, needed organizational leaders and sponsors who were supportive of their activities and comfortable with the relatively uncontrolled and unsupervised nature of on-line exchanges and interactions. Overall organizational culture and political environment were similarly crucial. In addition, workers were more likely to participate in virtual discussions and use virtual resources if they saw topics as relevant to their everyday responsibilities or, in more exceptional cases, the longer-term strategic objectives and priorities of their organizations—conditions that would be likely for many professionals. Finally, virtual CoPs were also likely to be more successful at start-up if they were formally institutionalized—i.e., recognized and integrated into formal work responsibilities and routines.

In a more practical vein, Wenger and his colleagues have attempted to introduce the idea of ‘technology stewards’ for ‘digital habitats.’ The underlying idea is that collaboration and learning are now increasingly mediated by digital tools and housed in electronically-saturated workplaces; in this context, technology stewards skilled in developing on-line or virtual connections and patterns of communication can play a crucial role in exploiting the learning potential embedded in such ‘habitats’ (Wenger et al. 2009). Given, however, the still-nascent and emerging role of virtual CoPs, more monitoring and research will need to be done in this area before more definitive conclusions regarding their contributions can be reached.

37.3 Knowledge Sharing Through Networks

There is a considerable degree of overlap in the territory covered by research into teams, communities of practice and knowledge networks. In fact, organizational leaders, researchers and consultants frequently use network terminology to describe

communities of practice, for example as ‘learning networks,’ ‘networks of excellence,’ and so on (Archibald and McDermott 2008; Hildreth and Kimble 2004). Both the CoP and knowledge network concepts share in common the insight that social life brings individual actors together into recursive and relational patterns that can, in turn, have a significant impact on how tasks are accomplished, resources are distributed, and learning takes place. But the CoP and network concepts diverge on how these patterns and their underlying structures and dynamics are to be conceptualized and researched. On the one hand, the CoP literature tends to rely on ethnographic and other qualitative techniques to reconstruct the tacit, informal and meaningful dimensions of work-based learning as a form of culturally situated and collectively motivated practice. Research into networks, on the other hand, has advanced by combining sophisticated mapping with statistical techniques to pursue a rigorous, quantitatively-oriented formal modeling strategy.

While network language and imagery have become popular with social networking platforms such as Facebook and Twitter, scientific research into social networks has remained focused on developing and extending certain basic analytic tools and ideas. On one level much of this work has been conceptual; thus, social network analysts have expended considerable intellectual energy developing and refining measures for concepts such as network tie strength, density, size, closeness, betweenness, and eigenvector (see Borgatti et al. 1998 for a more detailed review of these concepts). But on a more substantive level network research has also attempted to identify and classify networks according to the substantive content of network ties—i.e., the kinds of relationships that inform network ties, such as friendship or advice—as well as implications for collective outcomes or patterns of behavior.

In the organizational context, one of the central thrusts of network research has been to analyze how networks can be used to produce and mobilize social capital. Though this concept has given rise to a voluminous literature across different intellectual traditions (see, e.g., Bourdieu 1986; Coleman 1988; Portes 1998), the underlying intuition is that actors draw upon their network of social ties and relationships as resources for securing important advantages, such as access to jobs, education, and business and professional development opportunities (Adler and Kwon 2002). Network analysis can be used to illustrate and measure how factors such as network location and strength of ties can have different impacts on a person’s supply of and access to social capital. However, network analysis has offered sometimes counter-intuitive insights, for example, Granovetter’s (1973) finding establishing the ‘strength of weak ties’ in circumstances where people seek new information likely found outside a close inner circle with shared social capital.

The import of social capital research is that collective groups, like individuals, can utilize internal (and external) ties and relations to produce knowledge that can be used to achieve progress toward strategic goals and objectives. Cohen and Prusak (2001), for instance, recommend that organizations make investments in social capital as they do with financial or human capital. Building up the capacity of internal actors and units to develop ongoing relationships, trust, and cooperation will facilitate knowledge and information sharing, and help organizations to improve performance. Such investments may include opportunities for professional networking

and information-sharing; social events designed to encourage trust- and team-building; and mentoring, coaching, and advice networks. These mechanisms are available to develop internal relationship networks in ways that build up social capital, enhancing prospects for cooperative problem-solving and innovative activity. However, as Small (2009) has demonstrated in his study of social networks in New York City day care organizations, social capital formation may be affected by even seemingly minor differences in organizational rules, regulations, and procedures. Rules and procedures, regulating day-to-day tasks and activities, were found to have a profound effect on the degree and frequency of interactions that lead to knowledge-sharing and interpersonal network formation.

Another branch of research within the network tradition has focused more intently on problems of knowledge-sharing among teams and units within organizations. Project teams and organizational subdivisions are often tasked with assignments that require them to utilize not only internally available (within-team) stocks of knowledge and expertise, but also to reach outside to other units. The guiding hypothesis is that teams that are more advantageously positioned within broader networks to secure useful or needed knowledge are more likely to complete projects faster and more effectively. However, determining how network position, and which networks, can affect unit-based learning is complicated.

Tsai and Ghoshal (1998) introduced social capital into a research design intended to examine information sharing among 15 units in a multiunit electronics firm. They distinguished among the structural, relational, and cognitive dimensions of social capital: the structural dimension referring to the network of interaction among units, the relational to levels of perceived trustworthiness of unit members, and the cognitive to perceived congruence of vision (including interpretations of goals and aims) across units. Professional collaboration within institutions or organizations might be especially sensitive to relational and cognitive dimensions of social capital, given deep professional knowledge, mindsets, and loyalties that might affect openness to other professionals' views and diagnoses of a commonly shared challenge. They hypothesized positive individual and dyadic effects of these three dimensions on the degree to which units shared information and resources and thus the likelihood of innovation, with units more centrally located in the network more likely to consider one another trustworthy and more likely to hold shared visions of company aims. After running a series of regressions, they found positive individual effects of each dimension of social capital on information and resource exchange, and positive effects in the two-way relationships between trustworthiness and the other two dimensions. However, there was no significant relationship between patterns of social interaction and degree of shared vision, indicating that company units do not necessarily have to interact with one another on a frequent basis to share a particular interpretation or understanding of common goals. The substantive implication of their study, however, was to highlight the utility for organizations seeking to promote resource sharing and innovation in investing in these different dimensions of social capital (Tsai and Ghoshal 1998).

The work of Hansen and his colleagues in using network analysis to explore intra-organizational collaboration has also been useful in developing insights into

how knowledge contributes to performance gains and innovation. In a study of 120 new product development projects in 41 business units of a large electronics company, Hansen (2002) found that project teams were more productive only if they had shorter interunit network paths to units that possessed knowledge related to project team tasks. That is to say, project teams in company divisions that had close relations—and therefore fewer intermediaries to project teams in other divisions that also had related knowledge—were more likely to complete projects faster (for similar findings, see Tsai 2001). However, neither network path length nor extent of related knowledge alone had any effect on project completion time. It was not sufficient for a team to be closely located to other teams within a network of organizational relationships; the other teams also had to have relevant knowledge to share in order to increase productivity. Moreover, Hansen found that direct network relations—where paths are as short as possible—between units had different effects on task completion depending on whether knowledge sharing was codified or non-codified. Direct relations help to transfer non-codified knowledge and information, since non-codified information was more easily transmitted where persons had prior interpersonal relations or experience of working together. However, where codified information was involved, direct relations had negative effects on project time completion, since such relations entail maintenance costs in the form of expenditures of time and effort (Hansen 2002). Inter-professional learning may therefore be affected by the kinds of network relations that exist both within and between teams, and how cooperative or competitive those relations might be.

Boundaries between professions can be challenging to bridge, given deep knowledge within professions. However, common goals and proximity can mitigate boundary relationships and enable sharing of knowledge across professional networks through individuals who work together in teams. A study of work and learning among different professionals in a radiation oncology unit of a hospital in northern Italy, for example, showed how professionals learned together due to strong shared patient focus and openness to new information (Tagliaventi and Mattrarelli 2006). The researchers found that “the type of knowledge sharing between different professional groups ... evokes a new kind of Organizational Citizenship Behaviour” in which members of the team voluntarily helped one another, going beyond their formal duty, thus blurring typical boundaries between professions (p. 311). Practices were shared across professional lines that would otherwise have been held within that specific practice due to proximity and norms of collaboration.

37.4 Discussion: Implications for Professional Learning in Practice

Many organizations today have moved away from rigid, hierarchical structures toward increasingly flexible arrangements that are seen as more capable of responding to rapid shifts and challenges emerging from uncertain and ever-changing environments.

With this shift in perspective, professional groups and other kinds of collective units and structures—such as teams, communities of practice, and networks of various kinds—have gained recognition as sources of inter-professional learning and performance.

Thus, the lines have blurred between individual learning, and the groups and communities people join to collaborate to reach goals and solve problems. Individual motivation, learning, and performance are the starting point; but such learning is often intrinsically connected to social learning. Studies and accounts of practice show that much learning at work takes place through observation and interaction with others while addressing real work challenges, as in the radiologic oncology team study cited earlier (Tagliaventi and Mattrarelli 2006).

Certain unifying themes recur throughout these otherwise different literatures on teams, CoPs, and networks with respect to professional collaboration and learning. Professional knowledge is codified and passed on through extensive education and training, yet it is clear that when professionals apply their knowledge to new and challenging situations, they can benefit from soliciting and examining diverse views relevant to the situation at hand. Teams and other collaborative structures can facilitate inter-professional learning in response to emergent and outstanding problems. Collaborative professional learning centered on particular work challenges is sensitive to a variety of contextual factors and circumstances—such as workplace climate, leadership, and interpersonal dynamics and relationships—that are difficult to design or specify in advance, and which therefore require ongoing effort, commitment, and attention. Professional expertise and training—which should predispose toward continuous learning—can also impede openness to other ways of thinking due to different professional knowledge bases, also deeply held by other professionals on a team.

Differences in context matter a good deal when considering implications for professional learning in practice. Organizational dynamics, processes, and structures also affect the extent to which professional collaboration is possible, expected, and rewarded. Collaborative learning requires a sensitive appreciation to how workplace challenges, task division and allocation, and climate intermix in ways that lead to more effective and innovative solutions to organizational problems and challenges. Organizations differ from one another not only because they pursue different goals, objectives and strategies. They also have different histories and experiences of success and failure, and therefore have different learning and performance needs. Many different organizational factors shape a professional's learning environment focus, but among the most important are its culture, including trust, structure and communication, and leadership/management practices (Gephart and Marsick [forthcoming](#)).

Trust, for example, is needed in order to ask candid questions, get and give feedback, communicate freely, and build learning relationships. Much informal learning is tacit and acquired while talking with, or observing, others. Informal learning is believed to promote capabilities needed to develop and exercise tacit knowledge; and for understanding context, problem solving, decision making, and communication. High Performance Work literature emphasizes trust as a pre-condition for effective learning (Fuller et al. 2003).

The literature suggests that professional collaboration is likely stronger in organizations that encourage and support trust among its members. Bryk and Schneider (2003), for example, researched relational trust across 12 different school communities in Chicago through observation, interviews, focus groups and longitudinal statistical analyses of survey data from more than 400 Chicago elementary schools. They found that elementary schools with high relational trust among teachers, principals, parents and other professionals and staff in schools showed greater improvements in student learning than schools with less relational trust. Relational trust was built through daily social exchanges, supported by the leadership of the school. Its components, they found, were based on respect, personal regard, competence in core role responsibilities, and personal integrity.

Eraut (2004) identifies structure and communication as key contextual factors that support or inhibit learning, e.g., allocation, challenge and valuation of work tasks; ability to communicate and interact with others; and effective feedback and support. Reporting on a study conducted by Yates on the informal learning of radiologic technologists, Marsick and Yates (2012) described the centrality of relationships, feedback, and support by other professionals for the informal learning of new graduates of radiography programs for transferring both explicitly codified and tacit knowledge of other team members. Yates suggests that their learning strongly resembles that of communities of practice, and recommends that such communities be fostered in health care settings to more effectively share knowledge and support informal professional learning at work. Leaders and managers, as well, have a good deal of influence over trust, learning culture, structure and communication. Ellinger (2005) underscores that managers must model learning. Immediate supervisors and the work climate they set are the most important factor for success of any initiative, including informal learning as they provide feedback, coach, develop, influence job design, arrange resources, or reward success.

This review suggests that professional learning is enhanced by attending to social structures and climates for effective work performance, enabling motivated professionals to engage in challenging tasks with sufficient support from peers, leaders, clients, and others with whom they interact to reach goals that are intrinsically energizing.

Perhaps one of the more interesting questions, still to be fully researched, arising from these different strands of literature on collective learning concerns the problem of knowledge and knowledge integration. Whether considering the benefits of teamwork, to the informal learning that takes place in ‘communities of practice,’ or the information and knowledge pooling that takes place across knowledge networks—a key question is how different kinds of work arrangements and relationship lead to not only an overall enhancement of professional competencies and stocks of knowledge, but also to inter-professional collaboration to produce richer, integrated solutions among groups of different professionals responsive to evolving problem situations. For instance, Edmondson’s recent work on ‘teaming,’ as opposed to ‘teams,’ suggests that the task for contemporary organizations is not to privilege the team as a particular effective work arrangement per se; in fact, in ever-changing work environments, team membership often fluctuates from situation to situation.

As a result, professionals could conceptualize teaming as an inherently dynamic *process* of forming, renewing, and reshaping collective and reciprocal relationships in ways that respond to shifting needs and problems.

In a similar vein, Gardner et al. (2012) argue that team- and CoP-based research has conventionally focused on the benefits of transactive memory systems, information-pooling and overlapping technical and task familiarity. However, comparatively little research has been done to show how collective units take advantage or fail to take advantage of members' stocks of practical experience, technical knowledge, and shared histories and interpersonal relationships in more or less effective ways. Collective learning thus becomes less a question of progressive mastery of a stable set of skills or stocks of knowledge, but one of ongoing alignment and realignment of existing resources—experiential, relational, and technical—in response to ever-changing circumstances.

Finally, as Solomon (2010) notes, the challenges to inter-professional collaboration can be strong—including rivalry and turf wars. However, she also cites reviews of research in medicine and health that offer “convincing evidence to support the idea that patient outcomes improve when care is delivered by collaborative teams” (p. 50). Solomon speaks to the importance and difficulty in creating a culture of collaboration. She notes that individuals can change the climate of the teams and groups with whom they interact, and this can, in turn, begin to affect other organizational or institutional dynamics to enhance inter-professional collaboration. Research into the dynamics of inter-professional collaboration and learning at work, and the organizational supports and barriers to effective collaboration, would shed light on how to make best use of collective learning structures for professional growth.

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Chapter 38

The Role of Human Resource Development in Organizational Change: Professional Development Strategies of Employees, Managers and HRD Practitioners

Rob F. Poell and Ferd J. Van Der Krogt

Abstract The aim of this chapter is to present, and provide empirical evidence for, a theory that gives central stage to actors operating strategically in the context of professional development. The learning-network theory (based on the seminal work of Ferd van der Krogt) deals with the organization of HRD taking into account the various ways in which different actors employ their own professional development strategies. It also assumes that neither managers nor employees will have very explicit ideas about the organization of HRD (which HRD practitioners tend to forget about in this connection). The chapter first presents the main tenets of the learning-network theory. It proceeds by describing a case study conducted in a healthcare setting, where managers and HRD practitioners attempted to introduce a new working method through a learning program. The case study also shows how employees (healthcare officers) worked on their own professional development. The chapter ends in a discussion of the different strategies employed by employees, managers, and HRD practitioners in organizing HRD.

Keywords Professional development • Human resource development • Learning program • Learning path • Learning-network theory • Case study • Actor strategies • Human resource management • Career development • Employee learning

Human Resource Development (HRD) is nowadays viewed as an important instrument to bring about organizational changes. HRD as a field, however, came out of the (mainly technical) training and development efforts that had boomed during and

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after World War II. Len Nadler has been credited with coining the term HRD at the end of the 1960s. In his view, HRD included improving performance on the present job (training), preparing individuals for future but identifiable jobs within the organization (education), and helping individuals grow to meet future organizational growth (development) (Nadler 1970). In the 1980s, Pat McLagan conducted a number of large-scale studies on behalf of the American Society for Training & Development (ASTD). She positioned HRD as the integrated use of training and development, career development and organizational development to improve individual and organizational effectiveness (McLagan 1989), reflecting a much broader idea about the goals of the field. The scope of HRD became even broader in the 1990s, with more attention being paid to self-directed, team, and organizational learning, to issues such as knowledge management and intellectual capital, and to strategic human resource policies. The latter notion is evident from John Walton's definition of strategic HRD as "introducing, directing and guiding learning activities undertaken by individuals in the organization in such a way that they will more effectively contribute to the achievement of organizational goals" (Walton 1999, p. 119). The shifting nature of HRD, with its permanently blurred boundaries, famously led Monica Lee to publish her "Refusal to define HRD" (Lee 2001). The ensuing debate about the definition of the field (see Hamlin and Stewart 2011, for an overview) will most probably continue for quite a while, with new developments in related fields such as e-learning, talent management, leadership development, and human resource management, amongst others. For the purpose of this chapter, however, we will define HRD as organizing professional development activities by a range of organizational actors, including but not restricted to employees, managers, and HRD practitioners.

Even from this brief introduction to some of the key notions from the field it is clear that HRD is often thought of as a 'tool of management'. A key idea is that managers get HRD practitioners to create learning programs that encourage their employees to develop the qualities necessary for making organizational changes. Empirical evidence, however, shows rather consistently that many such HRD programs are not very successful; employees do not participate in the programs very actively and their effects are modest (cf. Admiraal-Hilgeman and Geurts 2011; de Jong 2010; van Veen et al. 2011; van Veldhuizen et al. 2010). One of the key explanations for such findings may lie in the underlying perspective on organizing professional development, and especially in its (over) emphasis on didactics. HRD practitioners and managers use various didactical measures to attempt to motivate employees to participate in pre-designed training programs and make use of existing learning opportunities on the job. This chapter will argue, however, that organizing professional development to support organizational changes requires a different approach, and more than just a 'tool of management' perspective. This alternative approach should enable managers as well as employees to realize their own ideas about professional development. It should take into account the diversity of views and interests among different actors rather than attempt to eliminate it and create an organization where everyone shares the same opinions. This is possible when organizing professional development is not just viewed from a didactic perspective but also approached as a

strategic issue. This implies an acceptance of different actors placing their own emphases in the organization of employees' professional development.

38.1 Aim and Outline of the Chapter

The aim of this chapter is to present, and provide empirical evidence for, an approach that gives central stage to organizational actors operating strategically in the context of professional development, based on the learning-network theory (van der Krogt 1998; Poell et al. 2000; Poell and van der Krogt 2002, 2010). After providing some background theoretical notions about organizing professional development as a didactic vs. a strategic issue, the chapter will present the main tenets of the learning-network theory. It will then proceed by describing a case study conducted in a healthcare setting, where managers and HRD practitioners attempted to introduce a new working method through a learning program; the case study also shows how employees (healthcare officers) worked on their own professional development. This particular case was selected because of its usefulness to illustrate a way in which the learning-network theory can be employed, allowing as it does for an investigation of employees', managers', and HRD strategies in their mutual relationships. Based on a confrontation of the empirical findings with our theoretical assumptions, the chapter ends in a discussion of the theoretical and practical implications of the different strategies employed by employees, managers, and HRD practitioners for organizing professional development.

38.2 Approaches to Organizing Professional Development: A Didactic and Strategic Issue

Thinking about organizing employees' professional development has evolved strongly over the last two decades (cf. Harrison and Kessels 2004; Walton 1999; Yorks 2005). The roles assigned to managers and employees in these ideas have changed dramatically. Three approaches can be discerned in thinking and theory about organizing professional development: (1) a training issue; (2) a learning issue; and (3) a strategic issue. These will be elaborated upon below.

38.2.1 Professional Development as a Training Issue: Customization by HRD Practitioners

Within the first approach, the key task in organizing professional development is developing and delivering training programs attuned to organizational problems and developments as well as to the qualities of the employees. HRD practitioners design

educational programs customized to the organization and to the employees that will participate. Employees are viewed as clients, who need to be served in a tailored way. Customization is realized by taking into account employees' training needs and preferences as the program is developed and delivered (Romiszowski 1981; Robinson and Robinson 1989; Gully and Chen 2010).

The expertise of HRD practitioners is crucial here: they design the training programs and deliver them as well. They attempt to convince the ones who gave them the assignment, usually managers, of the intended training design and to motivate the employees to participate in it. The professional quality that HRD practitioners bring to these tasks plays an essential role as it determines their relationships with managers and employees. The organization that hosts the educational program plays a modest role: HRD practitioners will take into account the situation of the organization as they formulate the learning goals of the training program. Courses are thus attuned to existing and expected developments in the organization.

38.2.2 Professional Development as a Learning Issue: Didactic Self-Direction by Employees

The broadening of attention from training to learning in the 1990s caused a major shift in theory about the organization of employees' professional development. Besides their participation in training programs explicitly geared to encouraging learning processes, this second approach recognizes employees' participation in work processes also as a key mechanism to stimulate employee learning. Employees themselves (and not just the HRD practitioner) are expected to play a substantial role in organizing their own learning process: they need to learn to operate didactically. They can get help determining their own learning styles in order to act more explicitly and systematically in accordance with their preferences and strengths in learning (Bell and Kozlowski 2010; Candy 1991; Simons and Bolhuis 2004; Sadler-Smith 2006; Raemdonck 2006). Besides formal, explicit learning this approach incorporates self-directed learning on the job into HRD programs (Tannenbaum et al. 2010; Ellström 2001; Eraut 2004).

This approach gives a major and active role to employees themselves in organizing their professional development. Exchanging information and providing feedback are key elements in the learning programs. Interactions among the various organizational actors are a key focus. This perspective has received prominent attention in studies of workplace learning (van Woerkom and Poell 2010; Poell and van Woerkom 2011) and of learning organizations (Örtenblad 2004; Yang et al. 2004). The organization is viewed here as a learning context: a learning community, whose members cooperate and support each other in learning. Employees need room to shape their own ideas about learning (de Jong et al. 2012). Managers, colleagues, and HRD practitioners all have a coaching, facilitating, and supporting role. The various organizational actors need to hold similar norms and values in order for employees to be able to organize their self-directed learning.

38.2.3 Professional Development as a Strategic Issue for Employees and Managers: Micro-politics

Although HRD has long been viewed as a ‘tool of management’, recent years have seen an increased focus on employees’ individual responsibility for their own professional development (and career). Every employee is now expected to organize their professional development and strengthen their position on the internal and external labor market. This is echoed in notions about lifelong learning and employability (European Commission 2001; Hillage and Pollard 1998). The third approach views HRD as a micro-political and strategic issue also: organizational actors (e.g., employees, managers, and HRD practitioners) all have their own views and interests concerning HRD (cf. Coopey and Burgoyne 2000; Evers et al. 2011; Fenwick 2004; Illeris 2002; Kelchtermans 2006; Rainbird 2000). For example, managers tend to emphasize the role of professional development in optimizing the primary work process, whereas employees place more of a premium on its ability to contribute to career progress and work enjoyment (Kyndt et al. 2011). The organization is viewed here as a constellation of actors and facilities relevant to professional development. Managers and employees all attempt to gain access to these resources so as to realize their own ideas. Mutual viewpoints are discussed and negotiations take place about the directions that professional development should take and which facilities the various actors would need for that. Interactions among actors are largely determined by such relations and they involve many negotiations and compromises.

38.2.4 Comparing the Three Approaches

Table 38.1 summarizes the three approaches described above according to three dimensions: the nature of the HRD processes, the positions and roles of the various actors, and the perspective on the organization.

The three approaches differ, first of all, in terms of the nature of their key HRD processes. The customized-training approach emphasizes planning and pre-structuring by the HRD practitioner. The self-directed learning approach focuses on the motivation of the employees for learning; if they are provided with the necessary information they will use the available learning opportunities. In the micro-political approach, strategic negotiations among all stakeholders about the required facilities and contents of professional development are key activities. Another difference among the three approaches is in terms of the positions and roles that they attribute to the various actors. In the training approach, central stage is for the expert role of the HRD practitioner, who should be able to design educational programs both attuned to organizational problems and taking into account individual differences among participants. The learning approach pays most attention to the role of employees as self-directed learners; they are facilitated by other actors, who are assumed to hold similar views about the role of HRD. The strategic approach

Table 38.1 Comparing the three approaches to professional development

Dimension	Approaches to professional development		
	A training issue: customization by HRD practitioners	A learning issue: didactic self-direction by employees	A strategic issue: micro-politics by employees and managers
Nature of HRD processes	Designing, planning, and delivering training programs Taking into account individual differences among participants	Encouraging and motivating employees Creating conditions for their self- directed learning in the workplace	Negotiating about contents and organization of HRD processes and facilities Representing one's interests in professional development
Positions and roles of actors	Manager as provider of assignment HRD practitioner as training expert Employee as client	Manager as facilitator HRD practitioner as coach Employee as self-directed learner	All actors as stakeholders, who each have their own interests
Perspective on the organization	Inspiration for purpose and content of training programs	Learning context, learning community	Constellation of actors and facilities

is concerned with the different interests of various actors; the most influential stakeholders will have the best opportunities to realize their own interests. Finally, the three approaches differ with regard to their perspective on the role that the organization plays in HRD. In the customized-training approach, HRD programs are focused on the (impending) problems faced by the organization. The self-directed learning approach recognizes that the organization holds important learning conditions as well. The micro-political approach turns both the learning conditions and the learning goals into subjects for negotiation among all actors; employees, managers, HRD practitioners, and other actors have their own interests when it comes to organizing HRD and they all attempt to gain access to the facilities needed to realize those interests.

38.3 The Learning-Network Theory

The learning-network theory (Poell and van der Krogt 2002, 2010) combines the three approaches to professional development outlined in the previous section. It relates the customized-training approach with the self-directed learning approach and adds the strategic, micro-political approach to the equation as well. At the core, the learning-network theory posits that organizational actors create various HRD processes in interaction with one another; organizing HRD is a complex

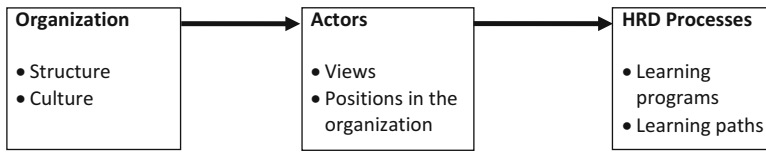


Fig. 38.1 Actors create HRD processes in the context of an organization

interplay of employees, managers, and HRD practitioners, each with their own views and positions, occurring in the context of an organizational structure and culture, as Fig. 38.1 shows.

Through mutual interactions, actors determine the contents (topics, goals) as well as the design (e.g., training course, on-the-job experience) of HRD processes. The what and how of HRD processes are thus highly dependent on the views of all relevant stakeholders. As they interact, all of them attempt to put forward their own ideas and preferences concerning professional development. Often their views will not be in line with one another; actors will have to discuss matters and attempt to convince each other of the relevance of their ideas. As Fig. 38.1 shows, how actors operate in HRD processes depends on the organizational context as well; on the opportunities they perceive to realize their own ideas about HRD, on the available facilities and latitude to influence HRD processes, and on the support they can gain to do so. In other words: the positions of actors in the organization have a major impact on the ways in which they operate in HRD processes. For instance, their authority and their relationships with other actors determine to a large extent actors' room to experiment on the job at their own initiative, to work on their careers, and to decide which formal learning activities to participate in (cf. Leisink and Greenwood 2007; Opfer and Pedder 2011).

38.3.1 Key Concepts in the Learning-Network Theory

The learning-network theory views 'organizing HRD' as creating opportunities by and for actors to gain experiences that can contribute to employees' professional development. The concept of 'professional development' is understood as all activities by which employees develop those qualities that are relevant to their work, their career, and their personal development. The related concept of 'learning' is a difficult one because it is used with many different meanings. At the core, learning is a process leading to changes in the action repertoire of an employee. The learning-network theory uses the broader term 'action theory' for that individual repertoire (cf. terms such as action logic, cognitive map, mental model; see Senge 1990; Taris and Kompier 2005). An action theory is a framework that enables an actor to interpret situations and act adequately, a combination of knowledge, insights, and behaviors that allow an actor to operate in an

organizational context (Argyris and Schön 1996; Billett 2008). For instance, employees will have their own views about how to do their job, their own notions about pursuing their career, and their own beliefs about furthering their professional development.

Professional development is based on the incorporation of experiences in an employee's existing action theory. As employees learn, they integrate their experiences on the job as well as in explicit learning situations into their existing action theories. Because of their learning these action theories change, which enables employees to act differently. In this sense, experiences are the basis of professional development (Billett 2009; Eraut 2004; Fenwick 2003). Organizing professional development, therefore, refers to creating and directing experiences. When employees attempt to direct their experiences, it means they try to gain those experiences that they think will contribute to improving their action theories. This occurs in training courses and education programs, which are especially designed to develop specific knowledge and/or behaviors within participants' action theories. Employees, however, gain various other experiences while doing their regular job as well, the learning potential of which they may not recognize until much later. Crucially, employees may not gain these experiences very systematically or explicitly as they occur; they may still, however, integrate them into their action theories at a later stage. This is how creating and directing experiences forms the basis of organizing employees' professional development.

Another core concept in the learning-network theory refers to 'actors operating strategically'. Acting strategically in the field of HRD is usually associated with managers drawing up plans to push HRD in a specific direction: strategic policy planning. The learning-network theory, however, assumes that all actors (i.e., employees besides managers and HRD practitioners) have their own ideas about the role of HRD and how their interests might best be realized through HRD. Those ideas will not always be as clearly developed as to be elaborated into action plans; nevertheless, just like other actors employees will have general notions about the possible directions in which they would like to develop themselves professionally as well as about the experiences and learning activities that could be relevant in that respect. When they act upon these general notions, employees can be said to operate strategically in HRD.

Organizing professional development is a social process: actors interact with one another, they exchange information and ideas, they try to convince each other of their opinions, and they attempt to acquire the facilities and means to realize their own ideas. These interactions in HRD processes are heavily influenced by the positions of, and relations among, the actors; the latter two aspects together are referred to as the 'network structure' in an organization. It comprises the authority of actors in specific positions and their opportunities to approach other actors through existing relationships. The network structure determines to a large extent the interactions among actors but also leaves some room for all actors in HRD processes to use their own particular (informal) contacts, often termed "their networks" (Goodyear et al. 2004; de Laat 2012).

The network approach outlined above finds its roots in thinking about inter-organizational networks (Gössling et al. 2007). In inter-organizational networks, actors from different organizations get together to give rise to a specific process, for instance, to develop a new product or to conduct a complex research project. Employees holding specific positions and competencies in their “home organizations” team up for such processes. These different actors interact with each other: they develop and execute plans, they discuss and solve problems, and in doing so they create a network structure (authority, consultation, communication) and other structures (procedures, facilities, a climate) that provide direction to their activities in the process. As they proceed, they gain all kinds of experiences from which they can learn, thus developing their action theories so that they can operate in this (and other) specific inter-organizational network(s). This type of network approach has gained great popularity in shaping and analyzing organizational processes (Kilduff and Tsai 2003) and can also be applied to organizing professional development: HRD or learning networks.

38.3.2 Organizing HRD in Organizations

An organization (e.g., a healthcare institution, a school, or a company) is viewed in the LNT as a collaborative relationship among several actors (e.g., managers, shop-floor employees, support staff, et cetera). All actors have their own beliefs and views about how the organization should work. To realize these ideas, however, actors are dependent on other actors, who hold positions that give them access to the necessary facilities and information. Positions and views of actors have an impact not only on the way the primary process in the organization is running but also on the way HRD is organized.

Over time, actors in organizations develop HRD structures and views about how HRD should be organized. They work on employees’ professional development on a regular basis. For instance, managers and/or HRD practitioners design training programs, introduce appraisal schemes and/or personal development plans, and contact external agencies offering relevant training courses. In doing so, both managers and employees learn about organizing professional development, about their tasks and responsibilities in developing and delivering learning activities. As these arrangements become more fixed over time, a specific HRD structure and HRD climate emerge in the organization; actors can then put these to use in working on employees’ professional development.

In principle, actors operate in accordance with the existing structures and the prevailing climate; they contact other organizational members, follow procedures, participate in courses and get involved in projects that enable them to engage in new experiences. Many actors, however, also deviate from common structures and the existing climate. They attempt to realize their own ideas, prefer to contact those colleagues that they trust and can get access to.

38.3.3 *Actors Organize HRD*

Professional development is not only the responsibility of individual employees; managers and supervisors recognize its strategic potential as well. Besides internal organizational actors, also various external actors (e.g., professional associations, government bodies, client organizations, trade unions and training institutes) view HRD as a crucial tool to bring nearer their ideas about the way organizations should be running (e.g., Bacon and Hoque 2010; Daley 2001; European Commission 2001). All actors attempt to realize their own ideas about professional development of employees. They use their positions and the available facilities to this end, and also try to get other actors to support their plans.

The learning-network theory assumes that each organization develops a specific way of organizing HRD. In some organizations managers have ample power to realize their ideas about HRD, in other organizations work teams have the best opportunities to do so. In still other organizations external actors manage to put a strong emphasis on the HRD processes, and there are also organizations where it depends very much on individual employees how HRD is shaped. Each organization has its own constellation of internal and external actors that give rise to the way HRD is organized. Among these actors, the HRD specialists are the most recognizable ones: for instance, internal and external trainers, continuing educators and mentors counseling new hires. Shop-floor employees, their internal and external colleagues, and their supervisors and managers, however, are also crucial HRD actors. And outside of the organization important HRD actors can be found as well, including sectoral training bodies and institutes.

All actors have their own beliefs and ideas about the organization of HRD, about the functions that HRD can fulfill and about the ways in which that should happen. Managers may, for example, emphasize the role of HRD in improving the primary work process, for which they deem on-the-job experience combined with training courses the best approach. Employees, on the other hand, could very well focus more on furthering their own positions on the labor market, deeming certified education programs the most suitable way forward to achieve this. Generally speaking, three functions that actors can attribute to professional development can be distinguished: work improvement, career development and personal development. The latter function refers to working on individual qualities that may not yet be relevant to work or career in the present situation but seem likely to become relevant in due course (e.g., assertiveness or analytical ability). In order to realize their beliefs and ideas, actors usually need other actors, who hold positions that give them access to information and other means. In other words: the positions of actors and their mutual relationships determine to a large extent how well they can realize their own ideas about the way the organization should be running. Their positions (tasks, roles and responsibilities) and relationships with other actors form a major part of the impact that managers and employees can have on organizational processes, including HRD processes (see Fig. 38.2).

As explained above, organizing professional development in our view refers to creating and directing experiences. This occurs mainly in the context of two key

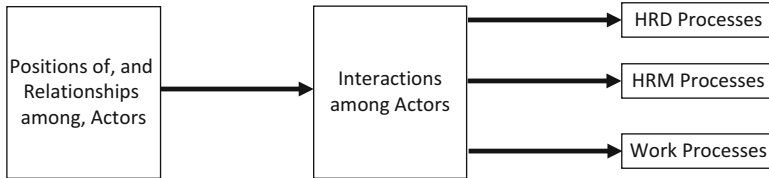


Fig. 38.2 Positions and relationships impact on HRD and other processes

HRD processes: during collective learning programs and in the creation of an individual learning path. Learning programs are usually initiated by managers, whereas employees create their own learning paths. Both HRD processes (and their relationship) will be illustrated in the remainder of this section.

38.3.4 Managers (and Other Actors) Organize Learning Programs

Learning programs usually come into being at the initiative of managers, who want to use learning and development to reduce their problems and support the implementation of their plans. Learning programs are created by several actors putting together a set of activities relevant for employees to gain experiences about a specific theme and to learn from. HRD practitioners (e.g., trainers and educators), managers and employees play a key role in this venture; however, HRM staff, content experts and external colleagues can also be involved. Two types of activities are carried out by the learning-program actors: creating learning-relevant experiences and (re-)directing the learning program. The first activity comprises the creation of various learning situations: both explicitly (e.g., workshops, training courses, assignments, self-study) and implicitly (regular on-the-job experiences, job rotation) geared for learning. The second activity, directing the learning program, can also be conducted in various ways: elaborating the learning theme; drawing up a detailed plan in advance; starting with a broad notion that gets more concrete along the way; and/or resolving problems as they occur during the learning program. Actors are at the core of learning programs being organized. They interact with each other to create experiences and direct them as well. How they do this depends largely on their views, which also determine to what extent and how the existing structures will be complied with (see Fig. 38.3).

Learning programs can be organized in different ways. Four ideal types can be discerned (cf. Poell and van der Krogt 2002, 2010):

1. *Loosely coupled, individual-oriented learning programs.* This type is probably most often found in organizations with self-sufficient employees, who feel responsible for their own work and development. A coordinator from the organization takes the initiative to form a project group that wants to learn about a specific theme. The coordinator attempts to gain a group of employees' interest

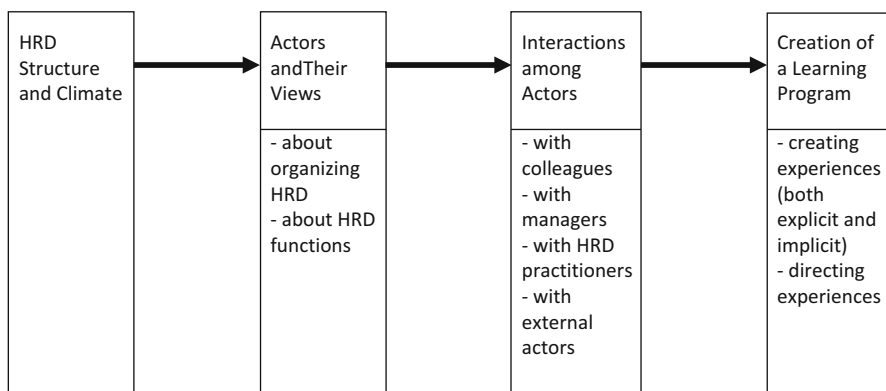


Fig. 38.3 Actors organize learning programs

in the theme, through informal contacts and/or a snowball strategy. These employees are interested; however, their main expectation is to be able to exchange experiences with each other from which they can learn. They also find the learning infrastructure and potential facilities offered by the project group interesting. At this stage, hardly any thinking has been done about involving other potential project-group members. The learning theme is still very general; each participant aims to elaborate this theme for him/herself, taking advantage of each other's experiences as well. Few collective decisions are made about the learning contexts and activities in the project group; the key concern is to acknowledge each employee's needs and preferences as much as possible. It is rather likely that sub-groups will emerge of employees expecting to be able to learn more from some participants than from others, or of employees that for practical reasons can work and learn together more easily. The evaluation of the program is not very systematic; the coordinator accounts for the deployment of resources with the management, whereas each participant decides for his/herself whether the project group yields enough learning to keep investing in it.

2. *Centrally regulated, function-oriented learning programs.* This type is designed, delivered and evaluated according to a pre-determined plan. Often the initiative comes from a line manager (or a member of the techno-structural staff), who has identified a problem in the primary work process or in the internal labor market, and who expects a learning program to be able to contribute to solving this. An HRD practitioner is then asked to design this learning program for a group of employees. An analysis of the problem is made with its owner and the HRD practitioner continues by presenting a (learning) plan for approval. In elaborating this plan, potential participants of the learning program and their supervisors are consulted, and content expertise may be hired. The HRD practitioner employs his/her own expertise and tools, within the boundaries set in terms of finance

and jurisdiction, for example: investigating participants' learning styles, determining their prior knowledge, proposing transfer-enhancing measures, building workplace assignments into the program, and encouraging the support from participants' colleagues and supervisors.

3. *Organic, problem-oriented learning programs.* This type is all about employees that conduct work together. The initiative usually comes from within the teams in which their cooperation takes place. Team members may, for example, run into a problem that they cannot solve using their normal working practices. The team then decides to pay more and explicit attention to this problem and can invite the help of a coach for that. Typical feature of an organic learning program is experiencing the joint analysis of the problem. Working in a team on a jointly defined problem is what differentiates this type from the individual-oriented learning program (where each participant uses experiences with other participants to solve his/her own problem).
4. *Collegial, method-oriented learning programs.* The theme for this type of learning program is often derived from new working methods developed within employees' professional association. Another possibility is that the theme revolves around a specific problem encountered by a group of professionals in the organization, which they are interested to study (and reduce/solve) with a group of *external* colleagues, so outside of their own organization. Applying new working methods is the driving force in both instances. Relations among the project-group members are based in each participant's content expertise and position within the profession. Studying literature and practical cases is a popular approach in this type of learning program.

38.3.5 Employees (and Other Actors) Organize Learning Paths

Employees can gain all kinds of experiences relevant to their professional development, both within and outside of the organization (Fenwick 2003; Illeris 2007; Svensson et al. 2004). They can attend training courses, study books and manuals, do their regular job and adapt it, solve every-day problems, take a coaching session, participate in an innovation project, change jobs, enter into a performance appraisal meeting, et cetera. Amidst this rich variety of activities and experiences, each individual employee carves out his/her own particular route, using the existing opportunities and creating new ones along the way. We refer to this process as the creation of a learning path (Poell and van der Krogt 2010). Employees can create an individual learning path in several ways. Three aspects of learning-path creation are relevant in this connection: interactions among the employee and other actors, gaining experiences in three processes, and directing and coordinating these experiences (see Fig. 38.4). In other words, gaining and directing experiences occurs as the employee interacts with other actors.

<p>In interaction with other actors:</p> <ul style="list-style-type: none"> * internal and external colleagues * supervisors and managers * HR practitioners * et cetera 	<p>Gaining experiences in:</p> <ul style="list-style-type: none"> * the primary process (work experiences) * career development (employability) * HRD processes (explicit learning programs) 	<p>Directed and coordinated by:</p> <ul style="list-style-type: none"> * thematizing * reducing professional-development problems * explicit professional-development strategies
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Fig. 38.4 Three key aspects of learning-path creation

38.3.5.1 The Employee Interacts with Other Actors

Learning-path creation is a social process created by an individual employee in interaction with other actors. Employee gain experiences as they interact with other actors (e.g., internal and external colleagues, supervisors and managers, HR(D) practitioners, et cetera). These interactions can take on different shapes, depending on a number of characteristics in the social context.

First, the social context can have different compositions (Blankenship and Ruona 2009). For instance, interactions may take place primarily between the employee and his/her direct internal and external colleagues, as is the case in many ‘communities of practice’ and ‘professional learning communities’. In other cases, experts or other specialists may be part of the social context as well, for example in learning project groups. Supervisors and managers may also be more or less influential in the social context of the employee’s learning path. Second, the social context can have varying degrees of differentiation. Sometimes many different activities are distinguished in the interactions, in other instances all activities are conducted in a much more integrated manner. Communities of practice often operate in an organic context, whereas many project-based learning contexts see a lot of differentiation, for example, between deciding on the learning theme and actually carrying out the learning activities associated with it. Third, the social context can have various levels of formalization. Increasingly, attention has gone out to informal and ad-hoc interactions among actors. Often there are attempts to develop shared views among the participants, to avoid other more formalized coordination mechanisms (e.g., specific procedures or supervisory roles).

38.3.5.2 The Employee Creates Experiences in Three Processes

Employees can gain their experiences in the context of three processes: the primary work process, the career-development process, and the HRD process.

The first process in which employees gain experiences is their every-day work process, as they carry out and improve their own work. They may also be involved

in innovation and use new tools or instruments, in interaction with other actors. Together with their colleagues, clients and supervisor, they do their job and solve every-day work problems. The kinds of experiences that they gain can obviously differ from one context to the other. Routine work offers them little variation in tasks and experiences, whereas for instance project-based work enables them to take on complex tasks with a substantial diversity in job-related experiences. The second process that offers a relevant context for employees to gain experiences is the career-development process. Employees can use interactions with other actors (e.g., HRM practitioners, career counselors, and their supervisors) to work on their careers and their positions in the internal and external labor market (employability). They may negotiate with them about their individual job contract and career opportunities. In this connection, they may have an interest in gaining broader and more diverse job experiences, acquiring new competencies that could give them access to interesting new positions. The third process that provides employees with relevant experiences is the HRD process, especially in the context of explicit learning programs. Professional development is the specific aim of participating in such activities, for example, learning-project groups, workshops, training courses, self-study, conference visits, reflection sessions, and study circles. They enable the employee to gain various kinds of learning experiences, in interaction with other actors (e.g., HRD practitioners, internal and external colleagues).

The fact that employees can gain experiences in these three processes does not imply automatically that these experiences will be meaningful to them, relevant to their individual learning path right away. It is important for the employee to have the impression that a particular experience can contribute to his/her professional development (around a theme that is relevant to them). ‘Converting’ or re-defining work and learning experiences into experiences relevant to their own learning path is a crucial step. The employee can do this by him/herself or together with other actors, who will also have their own ideas about what constitutes relevant experiences. Not all actors, however, are equally influential in this process of establishing ideas about the learning relevance of experiences gained. Often it will be the individual employee who places a heavy emphasis here, sometimes the views of their supervisor, an HRD practitioner or their colleagues have more impact. The collective ideas within his/her department or organization about the learning relevance of particular experiences (cf. learning climate) can also have a major impact on the individual employee’s process of integrating experiences into their learning path.

38.3.5.3 The Employee Directs and Coordinates Experiences in His/Her Learning Path

As we have illustrated above, an employee can gain experiences in three processes; creating a learning path means gaining, interpreting and linking these experiences to one another. Although the notion of an individual learning path may sound as if there is a pre-determined route, more often it is shaped along the way as the employee gives meaning to his/her interlinked experiences gained in various processes, directing new experiences on the basis of progressive insight. An employee

can direct and coordinate experiences in several ways: by thematizing, by reducing professional-development problems and by using explicit professional-development strategies:

1. *Thematizing.* This refers to determining an explicit theme for one's learning path, the topic about which the employee wants to learn. Often this is translated as setting learning goals; however, the employee can also use other methods. It may be easier to start with a general description of the learning theme, which is then elaborated along the way as the learning path takes shape.
2. *Reducing professional-development problems.* The second way for the employee to direct his/her professional development is to work on the problems experienced during the learning path. The employee may, for example, have the impression that the learning path is too much focused on improving every-day work, leaving too little room for career or personal development. He or she may want to pay more attention to competencies relevant for acquiring a managerial job in due course or for pursuing a professional career in another organization, rather than focus his/her learning path on the current daily tasks. Or maybe the employee feels that the learning path is not attuned to his/her present qualities: for instance, relationships with colleagues participating in a learning program may not work out, the topic of a learning program may be irrelevant to his/her learning path, the way it is treated may be too theoretical, or there are no obvious links with his/her every-day job. Such problems become manifest to the employee when a developing learning path is not well attuned to his/her qualities, in terms of both learning skills and work contents.
3. *Using explicit professional-development strategies.* The third way in which the employee can direct his/her learning path is by consciously employing a professional-development strategy. Often this is attempted by formulating learning goals; however, employees can also shape their professional development on the basis of their personal values and norms. What and how they learn can be influenced and inspired strongly by values they deem important (e.g., being independent, pleasing the supervisor, always doing one's best for the organization).

All in all, the ways in which a learning path is created and directed depend to a large extent on the views of the individual employee: (implicit) beliefs about organizing his/her professional development, about the relevance of particular experiences, about meaningful actors to be involved, about ways of directing and coordinating experiences, and about the functions attributed to his/her professional development.

38.3.6 Employees Link Learning Programs to Their Learning Paths

Participating in a collective learning program can give fresh impetus to an individual employee's learning path. It allows him/her to make contact with other actors, who could be meaningful to his/her own learning path. It also offers opportunities

to gain experiences that can be integrated into the learning path. The learning program can also exert its influence on the direction of an individual employee's learning path: it enables him/her to gain more insight into themes that could be meaningful to his/her professional development. Employees link the learning program to their own learning path in several ways. First, for instance, they can attempt to integrate experiences and contacts from the learning program into their learning path. Second, participating in a learning program can cause them to start a new individual learning path around a theme they found relevant. Third, employees may not do much at all in the short run with the experiences gained during a learning program; however, the latter may be 'stored' and could be integrated into a (then meaningful) individual learning path in future.

38.4 Case Study: An Organizational Change Project Supported by HRD

The previous section has described the key tenets of the learning-network theory. The focus of the chapter will now shift from theory to an empirical case study of a learning program that was used for the Implementation of an innovation. This real-life case of an organizational change project will be presented to see to what extent the learning-network theory offers insights into the ways in which various actors operate as HRD is deployed in organizations.

The setting for the case study is a large Dutch institution for the treatment of addictions, where an extensive organizational change project was conducted to introduce a new working method for healthcare officers. A learning program was organized to support the implementation of this method. Below, the institutional context will be described briefly. This will be followed by a description of the learning program. The section ends with an account of how the healthcare officers in this institution created their individual learning paths.

38.4.1 Organization of the 'Addiction Rehabilitation' Department

The case is set in one department ('Addiction Rehabilitation') of a large institution that treats addictions in the Netherlands. This department helps people suffering from addiction that have also been convicted by law. Comprising a departmental manager and five teams, it uses the services of various supporting units in the larger institution (e.g., HRM, Housing, Logistics, Research & Development). Each of the five teams consists of approximately 15 healthcare officers, supervised by a team leader and a work counselor. The officers are highly educated; most of them hold a higher vocational diploma in social work. Their job is to report about the situation of clients to the appropriate legal offices and to monitor their development as well.

The work counselor supports the officers and discusses with them on an individual basis their monitoring reports about the progress of their clients' treatments. There are also team meetings to discuss any work problems that occur.

Officers that are newly introduced to the department receive an induction program and additional training on top of the higher vocational education program that they have already completed in school. Ad hoc continuing professional education is also offered in the department. One of its team leaders is charged with initiating and coordinating the officers' professional development; other than that, they are individually responsible for their own professional development. The department can call on the services of a staff officer responsible for professional development at the level of the larger institution. At the national level, an external professional-development coordinator supports the various addiction centers and their officers in the area of continuing professional education.

38.4.2 Organization of the 'Working in Enforced Frameworks' Learning Program

From 2006 till 2008, an extensive learning program was organized in the department to support the implementation of a new counseling method (entitled 'Working in Enforced Frameworks'). External experts in the field of addiction rehabilitation had published a handbook on this method, which the management of the department wanted to implement. Management recognized the necessity of a learning program to support the change process. An external specialist was hired in the roles of content expert and learning coach. A project group was formed comprising the department head, the team leader charged with professional development, the staff officer from the larger institution, the external specialist and the national professional-development coordinator for the sector. They acted as a steering committee and were supported by a group of team leaders and work counselors functioning as their sounding board.

The learning program was designed and delivered according to a highly systematic plan, which can be summarized in three main activities: identification of learning topics; creation of learning groups and monitoring of progress:

1. *Identifying learning topics.* An extensive analysis was conducted to establish which skills the health officers would need to be able to work with the new method. After that, a learning-needs analysis was done among the officers, in which they could indicate about what topics they would like to receive further training. On the basis of both analyses a general development plan for each of the five teams was drawn up.
2. *Creating learning groups.* Learning groups were formed in each of the five teams, to a total of eight learning groups, each consisting of four to ten officers and a work counselor. Their meetings were also regularly attended by the external specialist. Each group determined its own learning theme and the ways to learn about it, using the steering committee's plan. Mostly the themes chosen

were connected to the new working method. In the learning-group meetings, participants presented cases from their own work practices; a few times they invited external experts. Meetings were held for more than a year, in varying frequencies (from every 2 weeks to once every 3 months).

3. *Monitoring progress.* During the process, deliberate attempts were made to inform both officers and management about progress and about the method's underlying (theoretical) ideas. Plans and actual progress were presented in special meetings as well as in the learning groups. Theoretical backgrounds of the new method were also extensively discussed informally and during data collection. Furthermore, intermediate evaluation reports were discussed with the project group.

38.4.2.1 Evaluation of the Learning Program

The external specialist conducted an evaluation of the learning program, together with the institution's staff officer responsible for professional development, using a written questionnaire. Evaluations were also carried out by the project group and in a meeting with the work counselors involved in the learning groups. In general, the officers and the other people involved were satisfied with the learning program and learning-group meetings. The learning groups allowed them to gain relevant experiences, which they could link to the deployment of the new working method. The overall impression was that the method was well received by the officers. Nonetheless, many of the plans that had been drawn up were not carried out as intended; many timelines were not made and the intentions of the learning program were reframed as well.

Several officers raised the question, at the outset of the learning groups, of how they should work on the development plan drawn up for their group. Also during the learning program, issues were put forward related to the roles of the team leaders, work counselors and external advisors. Their roles and interactions with the officers gradually became clear as the learning program progressed. The evaluation also brought to light that little insight had been gained into the officers' learning activities, other than their participation in the learning-group meetings (in which experiences with the new method were discussed and external specialists were invited for expert consultation). The initial idea of the project group was for all officers to draw up individual develop plans; however, besides expressing their learning needs in preparation for the project group's plan, the officers created such individual plans only to a very limited extent.

38.4.3 In Search of the Officers' Learning Paths

Besides the investigation of the organizational change project and learning program, two external researchers conducted an extensive qualitative study into the individual learning paths of 28 healthcare officers involved in the learning program. In-depth

interviews were held to determine the extent to which they had identified their own learning theme and worked on it systematically. Five types of learning path were found (Khaled 2008; Sloots 2008):

1. *The practice-oriented learning path* (n=6). This type is primarily focused on improving the every-day work process. Learning themes included, for example, motivational conversation techniques or dealing with traumatized clients. The 6 officers worked on such themes by exchanging their own work experiences during case discussions and meetings with colleagues and work counselors. They have a strong drive to perform their job well and develop their technical craftsmanship.
2. *The knowledge-oriented learning path* (n=3). This type sees officers picking learning themes that contribute to acquiring new (scientific) insights relevant to their profession. They attempt to gain more knowledge about, for instance, specific psychiatric diseases that their clients suffer from. Such knowledge is acquired by studying literature and inviting experts.
3. *The job-oriented learning path* (n=5). This type is concerned in the first place with getting or optimizing a specific job. Concrete issues tied to that job are selected as learning themes here. The five officers work on such themes by participating in specific learning contexts, for example, work meetings and consultations with experienced colleagues. Often these officers are looking for new challenges in their job or profession.
4. *The social-oriented learning path* (n=3). This type revolves around learning themes concerned with acquiring skills that are relevant for working with colleagues. The three officers use the learning-group meetings to discuss, for example, social interactions, getting recognition from other people and their own role within the team.
5. *The person-oriented learning path* (n=1). This type is created by an officer driven by a desire to discuss themes connected to their private lives outside work. A broad range of experiences in various processes, both in and outside of work, are brought into the learning-group meetings.

Although deliberate attempts were made in all interviews to establish a learning theme for every officer, in ten cases (out of 28) no such theme could be 'found'. These officers could not indicate a theme that they had gained experiences around or even thought about in more than passing.

38.5 Conclusions and Perspectives: How Actors Operate (Strategically) in HRD

What can be concluded from the case study in this healthcare institution about the ways in which different actors operate when it comes to organizing HRD? Does it provide any evidence that employees, managers and HRD practitioners operated in line with the theoretical expectations? To what extent do they act

strategically in organizing employees' professional development? And what are the implications of our conclusions for the further development of the learning-network theory and of HRD in practice? These are the questions that guide the remaining section of this chapter.

38.5.1 How Actors Operate in the Learning Program and Learning Paths

The learning program can be typified as centralized and systematic. The project group analyzed the future working method and its implications for the required qualities of the healthcare officers; in that sense, the learning program can also be termed function oriented. The management, HRD practitioners and external advisors had a considerable influence on the learning-program design. In its further elaboration the officers were more involved, especially in the learning groups. The intention was to enable them to place their own emphases, with a view to customizing the learning program; however, this did not really work out well. The learning groups turned out more as a platform for the execution of the departmental and team learning plans; the individual learning plans did not really materialize. The learning groups offered the officers little support in shaping their own learning paths.

Each of the actors placed their own emphases in the learning program. Management viewed it as a tool to support the implementation of the new working method. The HRD practitioners went along with this view; however, they also attempted to support the officers in their professional development. As the investigation of their learning paths has shown, several officers worked on their professional development during the course of the learning program; however, they were mostly following their own (learning!) path in doing so. Their participation in the learning program varied strongly from one officer to the next, which is apparent from their highly different learning paths. Some officers went with the themes that were central to the learning program, others placed their own emphases in terms of a learning theme and approximately one third of the total group of officers did not work on a theme systematically.

In the next paragraphs we will further discuss the ways in which the various actors (employees, managers and HRD practitioners) have operated in the organizational change project as well as the implications of this for the learning-network theory. For each actor, we will first present how they operated in the organizational change project and, after that, look at the theoretical implications concerning that particular actor.

38.5.1.1 How Employees Operate in Professional Development: Empirical Evidence

The healthcare officers could contribute only modestly to the development of the organizational change project. Their main role was in the execution of the program. Looking at their individual learning paths, clear indications were found for their

existence, although not all officers were as active in this respect. In line with an extensive overview of research into the roles of employees in their own professional development (Van der Krogt and Warmerdam 2010), the officers made modest explicit use of the opportunities to create a learning path themselves. In organizing their professional development, cooperation with other actors was limited and their relevant experiences were used rather indiscriminately, without much direction or coordination. Thematizing and reducing professional-development problems were not really on the officers' agenda, let alone any explicit professional-development strategies. To them, organizing learning paths is primarily a matter of putting their own qualities to use (often implicitly) in the job and deploying the available learning facilities and opportunities in their own individual way.

Great diversity in learning paths. A key conclusion from the case study is that officers worked on their professional development in many different ways. Their learning paths clearly took on different shapes and there were also quite a few officers who made hardly any use of their experiences in the learning program.

Experiences in learning programs as a basis for diversity in learning paths. The experiences gained in the learning program gave several officers the impetus to create a learning path. For example, they extracted their learning theme from the needs analysis and learning-group activities conducted. The further development of their learning path, however, remained a largely individual effort to most officers. The learning groups gave them little support in this respect. The officers mainly used their practical experiences with the new working method to inform their learning paths and could make little use of other training and development opportunities. Their individual problems received little attention in the learning groups and the same was true as far as making their own learning-path strategy explicit is concerned.

38.5.1.2 How Employees Operate in Professional Development: Learning-Network Theory Implications

A crucial finding from the case study is that employees participated in the learning program in very different ways. Each employee reacts to the plans and actions of managers, colleagues and HRD practitioners in his/her own manner (cf. Janssen et al. 2012). Their reactions are linked to the opportunities that they perceive to realize their own ideas and plans.

38.5.1.3 How Managers Operate in Professional Development: Empirical Evidence

The managers in the institution recognized that they could exert little direct influence on the healthcare officers' work. Although protocols and procedures had been drawn up, their application depended strongly on the officers' views and qualities. In this respect the managers were dependent on the officers. They also recognized

the relevance of professional development as a tool for the implementation of the new working method and attempted to use the learning program to encourage the officers to develop the required qualities. Strikingly, the managers influenced the learning program and the officers' learning paths mostly indirectly (cf. Soekijad et al. 2011). They asked HRD practitioners to design learning programs that matched the managers' needs and offered facilities (time and money) to this end. They had little direct business with the individual learning plans of the officers, which the managers left to the latter themselves to develop.

38.5.1.4 How Managers Operate in Professional Development: Learning-Network Theory Implications

Managers see professional development of employees primarily as a tool to support their own plans. Their position in the organization and relationships with other actors determine the extent to which they need to resort to professional development of employees to realize their own ideas. The more dependent the managers are on their employees and the fewer opportunities they have to manage the work through procedures and direct interactions with them, the more often they will call on learning programs to get their way.

The HRD literature offers little insight as yet into the roles and strategies of managers in organizing the professional development of their employees. More systematic attention should be paid to their activities in creating and directing learning programs and learning paths. Two topics are especially relevant in this connection. First is the ways in which learning programs are directed. Usually the emphasis here is on drawing up strategic plans (by HRD practitioners), with learning plans at their core. Re-directing learning programs by reducing problems along the way, however, deserves more attention as it would increase the contributions of employees (and therefore the chances of success). The second relevant topic concerns the role of managers in creating employees' learning paths. Current literature focuses on personal development plans, with a strong emphasis on the views of managers (Beausaert 2011). Other ways for managers to contribute to their employees' learning paths are in need of investigation (Bezuijen et al. 2010; Armson and Whitely 2010).

38.5.1.5 How HRD Practitioners Operate in Professional Development: Empirical Evidence

HRD practitioners played an important role in the learning program. They carried out its preparation and planning, conducting an extensive investigation into the required competencies and learning needs of employees. The data collected formed the basis of the learning plans of the department and its teams. Their role in the execution of the plans was much more limited. Their contacts with the managers (department head, team leaders and work counselors) were often, whereas their interactions with the healthcare officers were few and only incidental. The HRD

practitioners did observe that the individual learning plans of the employees were important. They created a manual for the officers to design a learning plan but contributed little to the development and execution of those individual plans themselves. The organization of learning paths was left to the employees in large part. The HRD practitioners (as well as the managers) were involved in (co-)directing the learning paths to a limited extent and contributed little to employees' gaining relevant experiences. All in all, the HRD practitioners' efforts were mainly focused on facilitating and designing employees' learning plans as well as on encouraging interaction among the officers. Supporting the officers gaining relevant experiences on the job and in explicit learning activities did not happen frequently.

38.5.1.6 How HRD Practitioners Operate in Professional Development: Learning-Network Theory Implications

The HRD practitioners did play an important role in designing the learning program and they also put forward ideas about the employees' individual learning plans. They focused primarily on the strategic options available to the managers and on the didactic aspects of the learning program. They did not succeed in customizing it to the participants, as is often the case in other learning programs as well (Poell and Van der Krogt 2005). As expected in the learning-network theory, HRD practitioners are strongly dependent on managers when it comes to organizing learning programs and learning paths. They will, therefore, focus on the HRD views and facilities put forward by management. Their weak position largely prevents the HRD practitioners from expressing their own HRD views in the learning programs and learning paths.

The learning-network theory should take better into account the possibility that besides managers, employees can also operate strategically in organizing HRD. This implies for HRD practitioners that they should pay more attention to customization in organizing learning programs: employees view the latter primarily in relation to their own learning paths. Problems of HRD practitioners in learning programs are often linked to both managers and employees operating strategically. The learning-network theory will also need to pay more attention to the positions of HRD practitioners in learning paths. It is too easily assumed that employees are able to create their own learning paths without much coaching. It should also be recognized that managers can also operate strategically in employees' learning-path creation, besides just facilitating them.

38.5.2 Perspectives for the Learning-Network Theory and for HRD Practice

This study was initiated to determine to what extent actors operating strategically play a role in organizing HRD in the context of organizational change. The learning-network theory was used as a framework in this effort. What are promising directions for further research into organizing HRD, both theoretical and empirical?

38.5.2.1 Organizing HRD According to the Learning-Network Theory

An important conclusion is that the organization of HRD is impacted by the positions of, and relationships among various actors as well as by their views on the ways in which HRD should be organized. All actors place their own emphases on learning programs and learning paths, linked to their positions and views. More studies should be conducted into the interrelationships among employees, managers and HRD practitioners in organizing learning programs and creating learning paths (see Figs. 38.2, 38.3, and 38.4). Special attention should go out to the issue of how these relations impact upon the mutual interactions among actors as they create and direct experiences. Oftentimes the interactions among actors ('networks') are considered crucially important to employees' professional development in organizational contexts, which is understandable from a didactic and learning-technological perspective. Interaction is understood primarily as giving feedback and exchanging information in those traditions. It is questionable, however, to what extent strategic issues can be resolved through communication and consultation only; the mutual dependence among actors will probably play a much larger role there and coalitions as well as negotiations could well be more effective to make differences in viewpoints and interests manageable. The ways in which HRD practitioners operate within this strategic game also deserve more attention in research.

38.5.2.2 Organizing HRD in Practice: Learning Programs and Learning Paths

An important and promising conclusion from this study is that learning programs are a key mechanism for employees to work on their professional development, through their individual learning paths. Employees use learning programs to organize their professional development in line with their own views and interests (Parding and Abrahamsson 2010). Hence, learning programs contribute to employees' professional development through learning paths. There are several ways to organize learning programs. The learning-network theory distinguishes among vertical/function-oriented, horizontal/problem-oriented, loosely-coupled/person-oriented and external/method-oriented learning programs. Each of these ideal types has its strengths and weaknesses; it is up to managers and HRD practitioners to choose and/or combine.

The ideas and plans of actors (especially managers) related to the learning program will not always materialize. Managers should accept that in most if not all cases, employees respond to interventions in a learning program differently. One possible reaction to this on the part of managers is to accept these different employee responses in an attempt to link them to their own ideas and plans with a sense of flexibility. Learning paths of employees, even in their early stages, do not necessarily have to match with the learning program exactly; the flexible response, moreover, will increase the chances that employees' learning paths contain elements that are in line with the ideas underlying the original learning program.

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Chapter 39

Mentoring as a Strategy for Facilitating Learning: Protégé and Mentor Perspectives

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Abstract Mentoring is an important learning experience for adults. The current chapter provides an overview of learning in academic and workplace mentoring, including an original review of published research on the topic. A total of 48 studies were identified that examined learning in mentoring relationships from the perspective of the protégé and/or the mentor. This literature is reviewed and a narrative summary of the findings are provided. Building on this narrative review, and integrating various established theories of learning and development, we then propose an integrative framework which depicts how, why, and under what conditions mentoring relates to learning. We close by offering an agenda for future research on learning in mentoring to guide future scholarship on learning in mentoring relationships.

Keywords Mentoring • Adult learning • Socialization • Personal development

Mentoring is a developmentally-oriented relationship between a younger or less experienced individual (the protégé) and an older or more experienced individual (the mentor; Jacobi 1991; Kram 1985). Mentoring relationships exist across the lifespan; youth can be mentored in afterschool and educational programs, young adults in college and university settings, and employees in organizational settings. Decades of research find that mentoring is related to a wide range of positive personal, attitudinal, and career-related outcomes for protégés (Allen et al. 2004; Eby et al. 2008; Eby et al. 2013). There is also growing recognition that the mentor can benefit from mentoring relationships (Allen 2007; Eby et al. 2006). Although the benefits are widely discussed, the mechanisms underlying the positive effects of mentoring are not well understood empirically (Ragins and Verbos 2007; Ramasawami and Dreher 2007). This represents a major gap in the literature because in the absence of identified causal mechanisms, it is difficult, if not impossible, to

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develop theories to explain how and why mentoring works. It also thwarts the provision of practical advice regarding what mentors and protégés should do to create effective relationships.

One mechanism that is proposed as important in understanding the positive effects of mentoring is learning (Kram 1985; Lankau and Scandura 2002, 2007). Protégé learning may be oriented toward how to perform better in school and adjust to college life (Campbell 2007), make more informed choices that lead to career identification, growth, and development (Ramasawami and Dreher 2007), or better understand how institutions such as universities, departments, and organizations operate (Chao et al. 1992). Although far less researched, mentors may also learn in mentoring relationships. For example, they can obtain new perspectives, skills, and information from protégés (Allen et al. 1997; Eby and Lockwood 2005). Mentors can also grow personally and professionally from the experience of mentoring others (Kram 1985; Fletcher and Ragins 2007). Due to the widespread belief that learning underlies many of the benefits of mentoring, the current chapter focuses on the role of learning in mentoring relationships.

The current chapter is organized as follows. We start with a brief overview of mentoring research and identify several boundary conditions associated with our chapter. This is followed by a more in-depth discussion of the role of learning in mentoring relationships. In doing so, we emphasize the different types of protégé and mentor learning that can occur. This sets the stage for the narrative review of empirical research (qualitative and quantitative) on learning in mentoring relationships. Following the narrative review, we integrate the research findings with existing theories of learning to propose a framework for better understanding the role of learning in mentoring. Finally, we offer an agenda for future research to better enhance our understanding of the antecedents, moderators, and outcomes of learning in mentoring relationships.

39.1 Overview of Mentoring Research

Much of what we currently know about mentoring can be traced to several seminal works. Levinson et al. (1978) studied the developmental trajectory of 40 adult men, emphasizing common milestones and life transitions. Descriptive accounts of these individuals identified the important role that mentoring relationships play in the developmental process. In terms of the college student experience, both Chickerling's (1969) conceptual model of student development and Astin's (1977) longitudinal study of student-faculty interactions also identified the important role that non-familial adult relationships play in the personal and professional development of young adults. Kram's (1985) in-depth, descriptive study of protégé-mentor dyads solidified mentoring as an important developmental experience in organizational settings. Of particular note is Kram's discussion of mutuality, whereby the mentoring relationship positively contributes to *both the mentor's*

and the protégé's personal and professional development through the reciprocal provision of support.

Collectively, these works laid the groundwork for several decades of mentoring research to follow. Two relatively independent streams of adult mentoring research exist and are the focus of this chapter. The first aims to understand mentoring that occurs in post-secondary and graduate/professional academic contexts (Jacobi 1991). Academic mentoring is based on the apprenticeship model of education, where a mentor provides guidance and support to a protégé on both academic and non-academic issues outside the classroom (Jacobi 1991). This type of mentoring is associated with academic achievement, scholarly productivity, professional development, identity development, academic persistence, and psychological health (Johnson 2007), among other things. The second stream of research on adult mentoring focuses on the workplace (Ragins and Kram 2007). This includes both supervisory mentoring and mentoring by a senior colleague outside a protégé's chain of command. Workplace mentoring is typically viewed as helping the protégé develop in his or her career (Kram 1985), although recent work recognizes that such an instrumental focus ignores other positive relational outcomes of mentoring, such as personal growth for protégés as well as mentors (Ragins and Verbos 2007). While both the academic and workplace mentoring literatures have traditionally focused on the benefits of mentoring for protégés, they both recognize that mentoring relationships are likely to be beneficial for mentors as well (Johnson 2007; Ragins and Verbos 2007).

39.1.1 *Boundary Conditions*

It is important to identify several boundary conditions associated with the discussion of learning in mentoring that follows. We recognize that mentoring can occur among individuals at all ages and take several distinct forms. Our chapter focuses exclusively on adult, one-on-one, hierarchical mentoring. Thus, we do not discuss the considerable research on youth mentoring (DuBois et al. 2002, 2011). We also do not discuss role-prescribed guidance provided by teachers, academic advisors, or executive coaches because this type of support differs from mentoring support in important ways (see Eby et al. 2007). Peer mentoring (McManus and Russell 2007) and e-mentoring (Ensher and Murphy 2007) are also excluded. Finally, in an effort to isolate the unique ways that mentoring may contribute to learning, we do not review the literature on college student development where mentoring may be one component of a larger intervention, such as the Upward Bound Program (www2.ed.gov/programs/trioupbound/). Another caveat associated with the present review is that we do not discuss differences in the content or outcome of learning based on the type of profession, job, or occupation. With that said, existing research on mentoring tends to focus on professional employees, and while some research focuses on particular professions (e.g., law school faculty, Haynes and Petrosko 2009; Navy midshipmen, Baker et al. 2003; principals, Brown-Ferrigno and Muth 2004),

predictions regarding the nature of the relationship between mentoring and learning are consistent across studies.

39.2 The Role of Learning in Mentoring Relationships

Learning refers to the systematic acquisition of knowledge or skill. Traditionally, the mentoring literature discusses learning in terms of job- or task-related learning (Ragins and Verbos 2007). However, the adult learning literature notes that another important aspect of learning is personal development and change in attitudes, behaviours, and other characteristics (Rogers 1963). This includes the development of broadly applicable interpersonal skills, as well as changes in how individuals see themselves in relation to others, which can promote self-awareness and personal growth (Merriam and Heuer 1996).

Specific to mentoring relationships, Lankau and Scandura (2002, 2007) make a similar distinction between types of learning. They develop a typology of learning in mentoring relationships that differentiates task/role learning from personal learning. Task/role learning is commonly referred to as *socialization* and focuses on the acquisition of knowledge that is specific to a particular task or role. Examples include organizational or institutional socialization (i.e., learning about specific aspects of an employing organization, university, or department) as well as professional socialization (i.e., gaining knowledge about a particular occupational role or professional specialty). By contrast, *personal learning* refers to the development of skills, knowledge, or competencies that contribute to personal development and are not specific to one's job or work tasks. This includes developing interpersonal skills such as communication, conflict management, and effectively relating to others, as well as identity development, personal growth, and adaptability.

Lankau and Scandura's (2002, 2007) typology is consistent with early theorizing that mentoring relationships provide an opportunity to gain a wide range of knowledge, skills, and competencies to address both personal and professional concerns (Kram 1985). With Lankau and Scandura's typology of learning as a back-drop, we now turn our attention to a narrative review of published empirical research on learning in mentoring relationships.

39.3 Narrative Review

39.3.1 Research on Mentoring

Mentoring has been examined in several ways in the extant literature. Some studies (e.g., Chao 1997; Ferrari 2004) compare individuals with and without mentoring experience to ascertain whether those who have been a protégé and/or a mentor

differ from those who have not been in a mentoring relationship. The comparison of those with and without mentoring experience examines whether experience as a mentor or protégé relates to learning. Other studies (e.g., Dutton 2003; Hezlett 2005) focus *only on those with mentoring experience* to determine whether various aspects of the relationship (e.g., amount of mentoring received by protégé, amount of mentoring provided by mentor, relationship quality) relate to antecedents and outcomes of mentoring. We summarize research findings for these two types of studies separately.

In the current review, we adopt Lankau and Scandura's (2002, 2007) typology and define *socialization* as information that is acquired about an organization or institution, such as learning about institutional goals and values, politics, important people, institutional history, role requirements, jargon or language, and performance standards (Chao et al. 1994). This also includes professional socialization, which encompasses learning about the broader set of expectations, skills, behaviours, and role demands associated with a profession (Chao 1997). *Personal learning* refers to the acquisition of skills that facilitate the development of more effective work relationships, personal identity growth (i.e., learning about one's strengths and weaknesses), and personal adaptability (i.e., learning how to respond effectively to changing situations) (Lankau and Scandura 2002, 2007).

39.3.2 Search Strategy

A comprehensive search of published research on learning and mentoring was conducted using the following electronic databases: PsychINFO, Business Source Complete, and ERIC. We used all derivations of the words "mentor" and "learn" with additional search terms associated with learning (e.g., socialization, identity, personal growth). The initial search yielded 3,263 unique citations. Then, several criteria were used to identify studies for inclusion in the present review. Studies had to: (a) be published in a peer-reviewed journal, (b) include original data collected for the study, (c) include the assessment of socialization and/or personal learning associated with mentoring, and (d) focus on traditional hierarchical mentoring relationships (e.g., no peer or electronic mentoring). Both qualitative and quantitative studies were included.

After applying these criteria to the initial search results, 48 studies were retained. All studies were published between 1992 and 2011. Fourteen studies (29 %) focus exclusively on socialization, eleven studies (23 %) examine only personal learning, and twenty-three studies (48 %) examine both socialization and personal learning. Thirty-seven (77 %) studies focus on the protégé's perspective, four (8 %) studies examine both the protégé's and mentor's perspectives, and seven (15 %) studies examine only the mentor's perspective. Most of the studies (n=28, 58 %) utilize quantitative research methods. A smaller number use qualitative research methods (n=13, 27 %) or combination of qualitative and quantitative methods (n=7, 15 %). The majority of studies focus on mentoring within the workplace (n=28, 58 %) and

one study (2 %) examined mentoring across the lifespan. Additionally, seven studies (15 %) investigated comparisons of individuals with and without mentoring, thirty-eight (79 %) studies examined the experiences of protégés or mentors, and three (6 %) studies investigated combination of both comparison and amount of mentoring provided/received.

In the review of the literature that follows we discuss the protégé's perspective first, followed by the mentor's perspective. In each section we provide a separate discussion of socialization and personal learning. For the protégé's perspective we begin by reviewing the literature comparing those with and without experience as a protégé in relation to socialization and personal learning. This is followed by a discussion of research focusing on how various aspects of the mentoring relationship relate to socialization and personal learning only among protégés. Due to the smaller number of studies examining the mentor's perspective we provide a general discussion of studies comparing those with and without experience as a mentor, followed by studies examining only those with experience as a mentor.

39.4 The Protégé's Perspective

39.4.1 Research Comparing Individuals with and Without Experience as a Protégé

39.4.1.1 Socialization

Three studies examining the career experiences of recent university graduates suggest that compared to individuals without mentors, protégés experience greater organizational socialization. Specifically, those with a mentor acquire more information about their employing organization (e.g., reward systems, informal political processes) after being hired compared to their non-mentored counterparts (Ostroff and Kozlowski 1993). Likewise, Chao et al. (1992) found that both formally and informally mentored employees report higher socialization related to understanding organizational politics (e.g., informal networks, power structures), developing work relationships, and understanding organizational goals and values compared to non-mentored employees. Additionally, informally mentored individuals report higher socialization regarding learning the organization's history and developing proficiency on the job compared to non-mentored individuals. In a follow-up study spanning 3 years, Chao (1997) found that currently and formerly mentored employees are better socialized in a variety of areas (e.g., people, organizational goals/values, organizational politics, organizational history) compared to non-mentored employees.

Four studies focus on socialization among professionals in academic workplaces. Consistent with research on non-academic workplaces, Haynes and Petrosko (2009) found that mentored senior law faculty report higher organizational socialization

related to establishing successful and satisfying work relationships and understanding the organization's goals and values, compared to their non-mentored counterparts. Likewise, compared to those without a mentor, beginning teachers with a mentor report more effective socialization, operationalized in terms of self-reported effectiveness of school induction support (Carter and Francis 2001). Among new faculty members, having a mentor is also associated with forming a stronger sense of ownership over one's department, receiving more adequate information about role expectations, and feeling integrated with colleagues (Schrodt et al. 2003). One study focused exclusively on the relationship between academic mentoring and students' socialization. In this study, Ferrari (2004) found that students with mentors report an increased awareness or understanding of the mission and values of their institution compared to students without mentors.

39.4.1.2 Personal Learning

Unlike socialization, personal learning refers to skills that facilitate personal and professional development and are not job-specific or task-specific. Four workplace studies compare the personal learning of individuals with and without mentors. Hartenian (2003) found that having a mentor is related to enhanced problem solving, communication, conflict resolution, goal setting, and planning skills. Likewise, Lankau and Scandura (2002) found that mentored employees report greater personal learning about the network of relationships associated with their jobs compared to those who are not mentored. Interestingly, they found no differences between mentored and non-mentored employees in terms of personal skill development. Another aspect of personal learning is identity development and personal growth. Chao (1997) found that protégés report more career planning and development than non-mentored individuals over 2 years. However, differences are not present by the third year of the study, suggesting that early mentoring experiences may be particularly impactful. Similar findings are reported by Chovwen (2004) in a study of female professionals in Ibadan and Lagos; those with mentors perceive greater professional growth than those without mentors.

39.4.1.3 Summary of Research Comparing Protégés to Non-protégés

Taken together, the literature reviewed in this section points to how experience as a protégé is beneficial for both socialization and personal learning. There is strong and consistent evidence that protégés are better socialized than non-protégés, in both academic and workplace settings. Fewer studies compare personal learning among those with and without mentoring experience. However, these studies suggest that those with experience as a protégé may benefit in terms of personal skill development and identity growth compared to their non-mentored counterparts.

39.4.2 Research on Socialization Among Protégés

Twenty-seven studies examined protégé socialization. Fifteen of these studies focused on workplace mentoring and twelve investigated academic mentoring. In the workplace, the receipt of more mentoring support is associated with various indicators of socialization. This includes opportunity recognition among novice entrepreneurs (St. Jean and Tremblay 2011), knowledge development (Eby and Lockwood 2005; Feldman and Bolino 1999; Hezlett 2005), overall socialization (Chao et al. 1992; Feldman and Bolino 1999; Liu et al. 2011), and job-related skills (Fletcher and Barrett 2004; Ryan et al. 2010). Academic mentoring is also associated with enhanced research skills (Behar-Horenstein et al. 2010; Kardash 2000; Koro-Ljungberg and Hayes 2006) and job skills (Rajuan et al. 2008; Walker et al. 2010). Similarly, college students who participate in mentoring programs that utilize working professionals as mentors report that learning in a “real world” setting helps them gain practical knowledge and industry-specific insight (Dutton 2003).

39.4.2.1 Antecedents of Protégé Socialization

Characteristics of the mentor-protégé relationship and of the protégé relate to the amount of socialization. In terms of relationship characteristics, there is some evidence that greater overall learning from the mentor occurs earlier in mentoring relationships (Eby et al. 2004), presumably because there is more opportunity for protégé skill development. Moreover, negative experiences with the mentor (e.g., disagreements, manipulation) are more likely later in a mentoring relationship and are associated with less learning among protégés (Eby et al. 2004).

There is also initial evidence that less socialization occurs in mentoring relationships arranged by a third party (formal mentoring) compared to spontaneous (informal mentoring) relationships (Eby et al. 2004). One explanation is that the volitional nature of informal relationships allows for greater relationship closeness (Ragins and Cotton 1999), which in turn may facilitate more opportunities for various types of learning. Along these lines, research finds that protégé job-related learning is positively associated with trust in one’s mentor and the mentoring relationship (Dever et al. 2000; Dymock 1999). Trust in the mentor also appears important in building a close relationship between students of colour and their mentors, which in turn predicts protégés’ university socialization (Smith 2007). Moderating effects are also reported; trust in one’s mentor strengthens the positive relationship between mentoring received and knowledge transference between mentor and protégé (Fleig-Palmer and Schoorman 2011).

Similarity with one’s mentor is also related to protégé socialization. Protégés in same-gender and same-nationality mentorships report greater task socialization in international assignments than dissimilar pairs (Feldman et al. 1999). Similarly, for African American psychology graduate students, being matched with a mentor of the same ethnicity is associated with increased professional socialization (Walker et al.

2001). Similarity in cognitive styles (Lin et al. 2010) and achievement orientation (Hirschfeld et al. 2006) also predicts greater protégé understanding of how one's job is connected to others. Notwithstanding the positive effects of mentor-protégé similarity, one study found that *dissimilarity* in expectations for the learning process predicts greater protégé socialization (Rajuan et al. 2010). The explanation offered was that socialization may be enhanced in situations characterized by both a supportive interpersonal context and challenges brought on by different learning expectations.

Research has also examined several protégé characteristics in relation to socialization. There is some evidence that younger protégés report less mutual job-related learning than older protégés (Finkelstein et al. 2003), perhaps because these younger protégés have fewer skills and life experiences to share with their mentors. In terms of race, African American protégés perceive that mentoring is more beneficial to their professional socialization compared to Caucasian protégés (Lease 2004). This may reflect differential exposure to role models, professional development experiences, and opportunities among African Americans and Caucasians.

39.4.2.2 Outcomes of Socialization

Work attitudes, role strain, and burnout have all been examined as outcomes of socialization. For example, when expatriates report greater work group and task-related socialization, job satisfaction and commitment to the international assignment is higher (Feldman and Bolino 1999). Along these same lines, Kleinman et al. (2001) found that organizational socialization fully mediates the relationship between mentoring received and both organizational commitment and role conflict. Additionally, the negative relationship between mentoring received and job burnout is partly explained by the socialization gains associated with mentoring (Kleinman et al. 2001).

39.4.3 Research on Personal Learning Among Protégés

Twenty-four studies investigated protégé personal learning. Of these, 13 studies were conducted in the workplace, ten were from academic contexts (e.g., college students receiving mentoring within the workplace, students receiving mentoring within academic institutions), and one study examined mentoring in both academic and organizational settings. There is consistent evidence that mentoring is related to personal learning. Mentoring is positively related to interacting more effectively with colleagues (Feldman and Bolino 1999; Fletcher and Barrett 2004), personal skills (Dymock 1999; Kleinman et al. 2001), communication and community integration skills (Behar-Horenstein et al. 2010; Walker et al. 2010), problem-solving and perspective taking (Eby and Lockwood 2005; Hezlett 2005; Rajuan et al. 2008, 2010; Walker et al. 2001), self-confidence (Dymock 1999), professional identification (Koro-Ljungberg and Hayes 2006; Ryan et al. 2010), and both personal and

professional growth (Baker et al. 2003). In addition, Lam and Chan (2009) found that the presence of supportive and accepting mentors (including non-work mentors such as parents or pastors) across one's lifetime relates to personal growth and professional identity development among protégés.

39.4.3.1 Antecedents and Moderators of Protégé Personal Learning

Several characteristics of the mentor-protégé relationship relate to protégé personal learning. Mentorships that are more collaborative in nature (Koro-Ljungberg and Hayes 2006), demographically matched (e.g., race/ethnicity; Walker et al. 2001; gender and nationality; Feldman et al. 1999), and characterized by higher agreement between the mentor and protégé regarding expectations of the mentor (Rajuan et al. 2008, 2010) are associated with greater protégé professional identity development and personal skill development. By contrast, the effects of relationship initiation on personal learning are inconclusive. Chao et al. (1992) found no differences in interpersonal skill building among those in formal mentoring versus informal mentoring, whereas Hartenian (2003) found that individuals in formal mentorships reported more personal skill building than those in informal relationships. These findings are at odds with meta-analytic research on mentoring, which finds that protégés report more psychosocial and instrumental support in informal, compared to formal, mentoring relationships (Eby et al. 2013).

A few studies focus on protégé characteristics in relation to personal learning. Liu et al. (2011) found that protégé emotional expressiveness is positively related to personal learning. There is also some initial evidence that protégé achievement orientation relates to protégé personal learning (Hirschfeld et al. 2006). Finally, protégé self-efficacy has been examined as a moderator of the mediated relationship between mentoring received, personal learning, and protégé outcomes (Pan et al. 2011). Both job performance and career satisfaction were examined, and self-efficacy operated differently for these two outcomes. The mediating effect of personal learning on the mentoring-job performance relationship is stronger when protégé self-efficacy is high. By contrast, the mediating effect of personal learning on the mentoring-career satisfaction relationship is stronger when protégé self-efficacy is low.

Several mentor characteristics also relate to protégé learning. For instance, protégés report greater gains in interpersonal skills when their mentors use teaching behaviours that are conducive to learning, such as observation and explanation rather than trial and error or general encouragement (Hezlett 2005). Additionally, mentors who adopt a flexible and adaptive leadership style tend to have protégés who develop stronger communication skills (Ralph 2000).

39.4.3.2 Outcomes of Protégé Personal Learning

Two studies examined the personal skill development of protégés in relation to outcomes. Lankau and Scandura (2002) found that personal learning is negatively related to role conflict and intentions to leave the organization, and positively related to

job satisfaction. In a study of Chinese protégés in an organizational setting, Gong et al. (2011) found that personal skill development predicts both mentoring received and career satisfaction. However, no effects were found for the personal learning associated with understanding the network of relationships surrounding one's job. Gong et al. (2011) suggest that the differential effects for these two types of personal learning may be due to Chinese employees' greater emphasis on personal skill development.

39.4.3.3 Summary of Research on Protégés

The literature examining learning among protégés consistently finds that as mentoring received increases, so does both socialization and personal learning. A wide range of antecedents have been examined in relation to protégé learning. For socialization, several studies find that trust in one's mentor and mentor-protégé similarity predicts greater socialization to the institution or profession. Although fewer studies exist, there is also some evidence that mentor-protégé similarity predicts personal learning. Compared to research on antecedents, much less is known about the outcomes of socialization and personal learning. However, there is some support for the idea that both predict more favourable work and career attitudes.

39.5 The Mentor's Perspective

39.5.1 Research on Mentor Socialization

Our search did not yield any studies examining experience as an academic mentor in relation to socialization. However, four studies document how experience as a workplace mentor relates to one's own socialization. Mentors report gaining a novel understanding of their institution and a broader perspectives on the challenges faced by both the institution and other teachers through the reciprocal learning they experience with new teacher protégés (Dever et al. 2000; Gilles and Wilson 2004). Likewise, Eby and Lockwood (2005) found that formal mentors in organizational settings report greater understanding of different business units in their organization by working with protégés. Female mental health nurses also indicate that being a mentor educated them on how organizational barriers for advancement and poor channels of communication can promote the exclusion of female employees (Woolnough et al. 2006).

39.5.2 Research on Mentor Personal Learning

Considerably more research examines mentor personal learning (11 studies), including personal skill development as well as mentor identity and personal growth. There were again no studies that examine mentor learning in academic

settings or directly compared mentors to non-mentors. However, seven studies investigate characteristics of workplace mentoring relationships or protégé characteristics that are related to mentors' personal learning. Eight studies focused on the specific ways that workplace mentoring facilitates personal learning for mentors.

Research finds consistent evidence of reciprocal personal learning in mentoring relationships. As mentor personal learning and information seeking from protégés increases, so does the amount of mentoring provided to protégés (Liu et al. 2009; Hirschfeld et al. 2006; Mullen and Noe 1999). In addition, mentors report greater personal learning in relationships of longer duration, higher quality, and when there is greater perceived similarity with protégés (Allen and Eby 2003). Furthermore, perceived competence and motivation on the part of the protégé predicts more mentor learning and information seeking from protégés (Mullen and Noe 1999). Experience in formal mentoring programs also creates opportunities for mentor personal learning, such as access to new networks that facilitate information sharing and professional identity development (Gilles and Wilson 2004; Rhodes 2006; Woolnough et al. 2006).

Research also demonstrates that mentoring is associated with personal skill development for mentors. Through reflection, mentors in a vocational education and training program report that the experience is related to the development of interpersonal skills, including better listening, communication, and feedback skills (Geber and Nyanjom 2009). Being a mentor also appears to facilitate a deeper appreciation of employees' perspectives on the workplace (Eby and Lockwood 2005). Along these same lines, mentoring is related to a better understanding of how to be a more effective leader (Eby and Lockwood 2005) and can provide mentors with an opportunity to reflect on and re-evaluate their teaching approaches, as well as hone their teaching skills (Gilles and Wilson 2004).

Several studies examining workplace mentoring find that experience as a mentor is related to identity development and growth. As a result of mutual learning, workplace mentors report gaining insight into their profession and professional identity development (Gilles and Wilson 2004; Rhodes 2006; Ryan et al. 2010), as well as greater openness to new ideas or strategies for approaching challenges (Dever et al. 2000). Mutual learning can also entail the development of a deeper understanding of the role of a mentor and what it means to be effective in that role (Dever et al. 2000; Gilles and Wilson 2004; Woolnough et al. 2006). Interestingly, Liu et al. (2009) further found that the amount of mentoring provided predicts the development of competencies that contribute to growth and identity of the mentor, which in turn enhances the mentor's own performance.

39.5.2.1 Summary of Research on Mentors

Our review of the literature supports the belief that mentors may have learning gains by serving as a mentor to others. It is also telling that mentoring others is related to the development of skills that improve interpersonal interactions with other employees and enables mentors to be better leaders within their respective organizations.

Furthermore, mentoring appears to help individuals understand their own behaviour and better understand the challenges facing other employees, potentially strengthening their own performance and managerial skills. Some mentors also report identity development and growth as a result of serving as a mentor. Although the empirical evidence is limited, it appears as though longer, higher quality relationships where the mentor provides more mentoring may lead to the greatest personal learning.

39.6 Proposed Integrative Framework

In addition to providing an up-to-date narrative review of empirical research on learning in mentoring, we offer an integrative framework to guide future research. This framework draws from established theories of learning and personal development and offers insight into how and why mentoring may lead to learning, as well as the likely outcomes of learning for protégés and mentors alike. In so doing, we also offer research propositions. The proposed framework is restricted to an understanding of learning among protégés and mentors. We do not address whether those with mentoring experience learn more than those without such experience. This decision is based on the consistent findings just reviewed that those with experience as a mentor and/or protégé learn from the experience. It also allows us to develop a comprehensive, yet parsimonious framework of learning in mentoring.

39.6.1 Theoretical Foundations

One of the most influential theories of learning is Bandura's (1997) self-efficacy theory. This is an extension of social learning theory (Bandura 1986) with the basic premise being that individuals can exert influence over their own actions. Bandura (1997) refers to this as "human agency" (p. 3) or the power that individuals have within themselves to make things happen. According to Bandura's theory, the extent to which individuals engage in intentional action depends on the beliefs that they hold about what they are capable of doing. He refers to these as self-efficacy beliefs, which are task or context specific and represent propositional expectations about success. Self-efficacy is important in the learning process because when it is high, individuals are likely to engage in behaviour that will lead to learning. By contrast, when self-efficacy is low, learning is thwarted. Empirical research supports this basic proposition; there is a consistently positive relationship between self-efficacy and learning (for a review see Bandura 1997).

A complimentary concept in the educational literature is Wood et al. (1976) discussion of scaffolding in academic contexts. This refers to the process by which an individual's capacity for learning and development is raised through the provision of guidance and instruction from a more experienced individual. Scaffolding is

discussed as an incremental process that culminates in learning that could not occur if an individual were left to his or her own devices (Bearman et al. 2007). With scaffolding, the “teacher” (mentor) controls aspects of the task to be learned that are outside the learner’s (protégé’s) capacity. This allows the learner to concentrate on and successfully complete aspects of the task that are at his or her developmental level (Wood et al. 1976). In so doing, the learner develops lower-level skills and self-efficacy which are necessary to tackle more challenging work in the future.

A final theoretical lens which has utility for understanding learning in mentoring comes from positive psychology (Csikszentmihalyi and Rathunde 1998; Seligman and Csikszentmihalyi 2000) and the sub-discipline of positive organizational scholarship, which applies these principles to understanding organizational phenomena (Cameron et al. 2003). Both of these perspectives emphasize positive experiences (e.g., happiness, fulfillment), positive individual traits (e.g., resilience, character), and positive institutions (e.g., schools, families) as a way to understand human potential, self-discovery, growth, and positive behavioural change (Cameron et al. 2003). Within both of these movements is a growing recognition that relationships are an important resource that can be leveraged for personal growth (Dutton and Heaphy 2003; Fletcher and Ragins 2007). In the discussion of how personal relationships add meaning to life, Dutton and Heaphy (2003) discuss the idea of a “high quality connection” (p. 263), which shares many similarities with mentoring. Although the traditional perspective on mentoring tends to focus on instrumental gain (particularly for the protégé), there is increasing discussion about how mentoring relationships can be transformative and invigorating for both the mentor and the protégé (Ragins and Verbos 2007). This is consistent with the idea of mutuality in mentoring relationships, where both mentor and protégé stand to grow and develop from their interactions, both personally and professionally (Kram 1985).

39.6.2 Proposed Framework

With these theories in mind, we turn our attention to outlining a proposed integrative framework on learning in mentoring. This framework is shown in Fig. 39.1 and applies to both protégés and mentors because both individuals can learn in a mentoring relationship (Allen and Eby 2003; Eby et al. 2007; Kram 1985; Ragins and Verbos 2007). In addition, because meta-analytic research generally finds similar associations between antecedents, correlates, and consequences of mentoring in academic and workplace contexts (Eby et al. 2008, 2013), the proposed framework does not distinguish between these two types of mentoring.

We adopt McGrath’s (1964) input-process-output model to highlight the mediating mechanisms underlying the learning that likely occurs in mentoring. On the left hand side of the framework are inputs. These represent characteristics of the mentor, protégé, and mentoring relationship. The experience of mentoring and the learning that results from it are shown as key processes. We consider both mentoring support behaviours (the assistance and support that mentor and protégé offer one another)

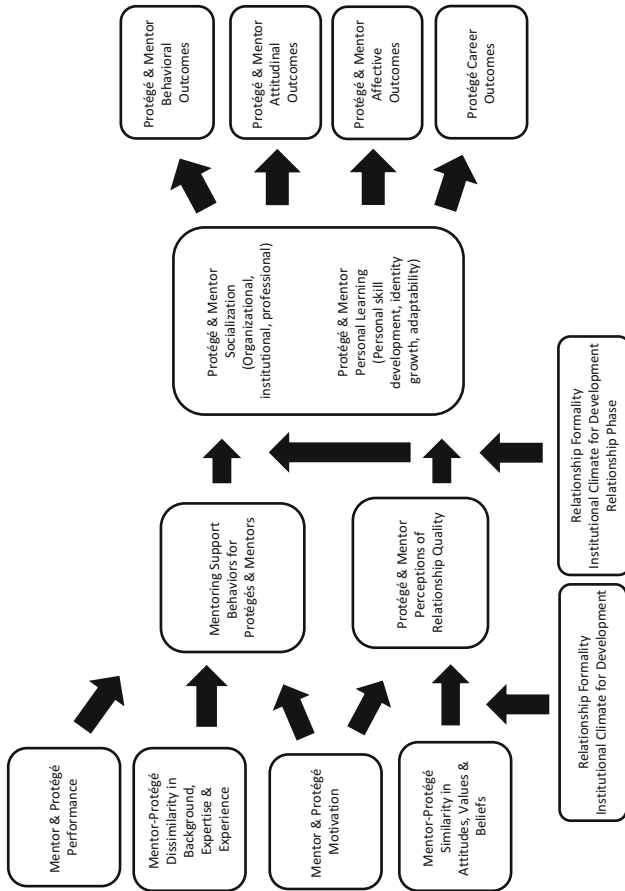


Fig. 39.1 Proposed integrative framework of learning in mentoring

and perceptions of relationship quality (the emotional connection to one's partner or the relationship). These represent two unique, but equally important, elements and encompass both the instrumental (i.e., what the mentor and protégé *do* for one another) and affective (i.e., how both the mentor and protégé *feel* about the relationship) aspects of the mentoring relationship (see Eby et al. 2013). Learning is represented as a direct outcome of mentoring support behaviours and relationship quality; in fact, by virtue of being in a mentoring relationship there may be heightened awareness of the learning process. Consistent with our narrative review learning includes both socialization and personal learning. On the right hand side of the framework are outputs. This includes behavioural, attitudinal, affective, and career-related outcomes for the protégé and/or mentor. Finally, several moderators are shown in Fig. 39.1. This includes moderators of the association between inputs and mentoring, as well as mentoring and learning.

39.6.2.1 Inputs

The first set of inputs represents protégé and mentor performance. Human capital theory (Becker 1975) suggests that higher performing mentors will have more to offer protégés through the learning process because of the investments they have made in their own skill development, education, and training. Protégé performance may also impact the extent to which mentoring leads to learning because higher performing protégés have the capability to learn more and may be more desirable as mentoring partners (Green and Bauer 1995; Olian et al. 1993). As shown in Fig. 39.1, we expect performance to relate only to mentoring support behaviours because of their shared instrumental focus. In support of this, in a recent meta-analysis of the youth, academic and workplace mentoring literature, Eby and colleagues found that protégé performance was positively related to mentoring support, yet unrelated to protégé perceptions of relationship quality (Eby et al. 2013).

The second input is protégé and mentor motivation. What an individual gets out of a mentoring relationship depends in large part upon the effort that he or she puts into it. As such, both protégé and mentor motivation are likely to be important predictors of mentoring support and relationship quality. For protégés, those who demonstrate greater motivation may receive more mentoring support from mentors (Hirschfeld et al. 2006; Noe 1988), enhancing the potential for learning to occur. Likewise, there is evidence that mentors are more likely to provide support to protégés who demonstrate motivation to learn (Allen et al. 1997). Mentor motivation is also important to consider since mentors are under no obligation to provide mentoring support to protégés. Moreover, we know that mentors vary considerably in both the extent to which they provide support to protégés (Eby et al. 2007) and their motivation for mentoring (Allen 2003). As shown in Fig. 39.1, motivational constructs are expected to predict mentoring support and relationship quality.

A third and final set of inputs represent mentor-protégé similarity. We consider both: (1) *dissimilarity* in expertise, background, and skills and (2) *similarity* in attitudes, values, and beliefs. Building on the findings reported by Rajuan et al.'s

(2010), we propose that greater *dissimilarity* between mentor and protégé in terms of expertise, background, and skills is expected to predict the receipt of more mentoring support behaviours. Although speculative, this may occur because of the greater learning opportunities in relationships where mentor and protégé are different in terms of their skill set, perspectives, and experiences. By contrast, we expect that *similarity* in values, attitudes, and beliefs will predict both mentoring support behaviours and relationship quality. Social-psychological research on close relationships finds that perceived similarity predicts relationship closeness, trust, and disclosure (Bukowski et al. 2009; Graziano and Bruce 2008), all of which are indicative of high relationship quality. This is consistent with the results of the present review, as well as a recent meta-analysis (Eby et al. 2013) which finds that perceived similarity is the strongest predictor of both mentoring received and relationship quality.

39.6.2.2 Processes

As described above, mentoring support behaviours and relationship quality are expected to result from protégé, mentor, and relationship inputs. In turn, learning should be maximized in relationships characterized by greater mentoring support behaviours and higher relationship quality (see Fig. 39.1). Bandura's (1997), self-efficacy theory provides an explanation for this effect. According to Bandura, self-efficacy is necessary for learning to occur and develops through (1) mastery experiences (practice doing something), (2) vicarious experience (observing others doing something), (3) verbal persuasion (feedback and encouragement), and (4) physiological or affective states (physiological and emotional feedback).

Mentoring incorporates all of these elements. Mastery experiences are the primary way that individuals learn about task/role responsibilities in mentoring relationships. This occurs through the provision of challenging assignments and sponsorship to protégés, where learning opportunities are provided which are commensurate with protégés' skill levels (Bearman et al. 2007). In addition, as discussed in the narrative review, mentors can learn new skills from protégés, suggesting the possibility of reciprocal learning (Eby et al. 2006; Kram 1985). Mentoring also involves vicarious experience. This comes in the form of observational learning or role modelling (Kram 1985) where protégés can develop a better understanding of the goals, values, history, politics, and relationships in their organization or institution. Mentors can also role model professional behaviour and instill confidence in protégés' ability to perform by watching mentors successfully master complex tasks. The third source of self-efficacy, verbal persuasion, is also a key component of mentoring. Mentors provide feedback, encouragement, and counselling to protégés as part of the learning process (Kram 1985). Likewise, as our narrative review highlights, protégés can provide mentors with feedback and information that improves their skills, both on the job and as a leader. Finally, protégés and mentors can receive counsel, support, and affirmation from one another (Kram 1985), which can be energizing and invigorating (Fletcher and Ragins 2007). By creating positive

affective states and reduced physiological stress, mentoring can influence physiological and affective states. It is also likely that by virtue of being in a mentoring relationship, there is heightened awareness of the learning process due to expectations that mentoring should lead to learning.

39.6.2.3 Outputs

Several categories of outputs are shown in Fig. 39.1. This includes behavioural outcomes (e.g., enhanced performance), attitudinal outcomes (e.g., increases in satisfaction and commitment), affective outcomes (e.g., vitality, energy), and career outcomes (e.g., promotion, salary). It is expected that the learning that occurs in a mentoring relationship is associated with behavioural, attitudinal, and affective outcomes for both mentors and protégés. Several meta-analyses document the positive behavioural and attitudinal outcomes of mentoring for protégés (Allen et al. 2004; Eby et al. 2008; Eby et al. 2013). Although less well researched, there is some evidence that mentors may also experience gains in behavioural and attitudinal outcomes from mentoring others (see Allen 2007 for a review). In terms of affective outcomes, little, if any empirical research examines how mentoring may lead to positive affective states. However, the growing positive organizational scholarship movement (Dutton and Heaphy 2003) and relational approaches to mentoring (Fletcher and Ragins 2007; Ragins and Verbos 2007) suggest that outcomes such as vitality, aliveness, and energy may be a consequence of the learning that occurs in mentoring, particularly personal learning. Finally, there is considerable research indicating that protégés experience enhanced career outcomes (e.g., promotion, career satisfaction, perceived career prospects) when they receive greater psychosocial and instrumental mentoring support (Allen et al. 2004; Eby et al. 2013). Very few studies have examined the career benefits associated with mentoring others, typically finding small effect sizes (Allen et al. 2006; Collins 1994). Moreover, whether or not mentoring others enhances the mentor's own career is likely influenced by other factors, such as the reward structure in the mentor's institution and opportunities for upward mobility. As such, it seems premature to speculate that mentor learning relates to mentor career outcomes and only protégé career outcomes are shown in Fig. 39.1.

Moderators. We also propose three constructs may moderate the relationship between inputs and mentoring, as well as mentoring and learning. As shown in Fig. 39.1, this includes institutional climate for development, relationship formality, and relationship phase.

According to both mentors (Allen et al. 1997) and protégés (Eddy et al. 2001), institutional support for learning and development is believed to be important in promoting and sustaining mentoring relationships. Indeed, a perceived cooperative context, decentralized institutional structure, and more team-oriented climate is expected to facilitate effective, high quality mentoring relationships, (Allen et al. 1997; Kram 1985; O'Neill 2005). In fact, research finds that perceptions of top

management support for mentoring correlates positively with mentor reports of higher quality mentoring relationships ($r = .22, p < .05$) and protégé reports of career-related ($r = .20, p < .05$) and psychosocial mentoring ($r = .27, p < .05$) (Eby et al. 2006). Likewise, an organization with a culture that supports individual development and provides opportunities for employees to interact with other organizational members is associated with the receipt of mentoring support (Aryee et al. 1999). It should also be noted that institutions which provide actual opportunities for career development are more likely to be perceived as having a favourable climate for development. As such, we propose features associated with a positive institutional climate for development strengthens the association between inputs and mentoring, as well as the relationship between mentoring and learning (see Fig. 39.1).

A second potential moderator is relationship formality. This refers to whether the mentoring relationship develops spontaneously through mutual attraction and shared interests (informal mentoring) or occurs as part of a program or initiative where a third party (e.g., committee, human resources representative) matches of mentors and protégés (formal mentoring; Campbell 2007; Finklestein and Poteet 2007). Informal mentoring relationships are distinct because individuals freely enter into the relationship (Ragins and Cotton 1999). By contrast, in formal mentoring relationships there is often a contract which specifies mutually agreed upon goals and sets expectations for the relationship (e.g., frequency of contact, meeting location, relationship length; Eby et al. 2007; Ragins and Cotton 1999). Due to their longer duration, greater emotional investment, and perhaps higher commitment on the part of one or both individuals (Ragins and Cotton 1999), we anticipate that the association between inputs and mentoring, as well as the link between mentoring and learning, will be stronger in informal mentoring relationships (see Fig. 39.1).

A final moderator is relationship phase. Like other types of relationships, mentorships are dynamic and progress through a series of phases, each characterized by unique attributes and patterns of relating (Kram 1985; Phillips-Jones 1982). The first phase is relationship initiation. During this phase the mentor and protégé come together informally, or through some formal process such as participation in a formal mentoring program. The next phase is cultivation, where individuals discover the value of relating to one another (Kram 1985). The provision of mentoring support should be at its highest during the cultivation phase as partners should be more comfortable interacting and understand each other's unique interpersonal style (Kram 1985). Importantly, as the cultivation phase continues, the relationship may shift from a one-way helping relationship to a mutually beneficial partnership. However, a time will come where the relationship has outlived its usefulness for one or both individuals. This marks the separation phase of the mentoring relationship (Kram 1985). The final phase of the mentoring relationship is redefinition, where the relationship may evolve into peer-like friendship (Kram 1985). Based on the relational dynamics at each phase of the relationship, as shown in Fig. 39.1 we expect that mentoring will lead to the greatest gains in learning during the cultivation phase.

39.7 Agenda for Future Research

Based on our narrative review of the literature and the proposed integrative framework, we offer some specific suggestions for future research. As our narrative review illustrates, there is surprisingly little published empirical research on learning in mentoring relationships and no research which disentangles the causal relationship between mentoring and learning. This is surprising given the emphasis placed on learning in seminal research on mentoring (e.g., Kram 1985; Levinson et al. 1978) and strong theoretical support for the importance of learning in mentoring. Learning is also a multi-faceted construct (Lankau and Scandura 2002, 2007) and no research to date directly compares learning outcomes in relation to mentoring. Moreover, few studies have examined identity growth or adaptability as a consequence of mentoring. Given that mentoring is often discussed as a transformative, impactful close relationship it seems especially important to examine personal learning in relation to mentoring, for both protégé and mentor.

Research Question 1: What is the causal relationship between mentoring and learning for protégés? In other words does mentoring lead to gains in learning or are those who report greater learning more likely to receive mentoring?

Research Question 2: Is mentoring more strongly related to socialization or personal learning for protégés?

Research Question 3: To what extent is mentoring related to protégé identity growth and adaptability?

The research discussed in the current chapter also points to a pressing need for research on learning among mentors. Relative to protégés, far less research has examined the antecedents and outcomes of mentor learning. Moreover, we found no studies that examined mentor learning in academic contexts. Better understanding what mentors can learn in mentoring relationships may enhance our understanding of both the choice to become a mentor and how much mentoring support mentors provide to protégés. Gaining this knowledge is important on both theoretical and practical grounds. If we hope to develop comprehensive models of mentoring, inclusion of the mentor's perspective is essential due to the pivotal role they play in the relationship (Eby 2010). In terms of practice, mentoring is a discretionary activity. Therefore, it is important to understand what mentors stand to gain from mentoring others if we want to encourage individuals to become a mentor.

Research Question 4: To what extent do mentors learn in mentoring relationships?

What exactly do they learn from protégés and is it different from what protégés' report learning?

If we increase our emphasis on the mentor's perspective on learning then a logical extension is dyadic research on learning in mentoring. This represents an important avenue for research due to the longstanding discussion of mutual learning in mentoring relationships and dynamic nature of the learning process. Therefore, we strongly encourage researchers to examine cross-over effects in terms of mentor

and protégé learning, as well as the investigation of how protégé inputs relate to mentor learning and vice versa. Such research has the potential to both deepen and broaden our understanding of how and why mentors and protégés learn in mentoring relationships. It is also consistent with recent writing on relational approaches to mentoring, which urges scholars to more closely investigate mutuality in mentoring (Fletcher and Ragins 2007).

Research Question 5: To what extent are mentor and protégé reports of learning related? In other words, do protégés report learning more in a mentoring relationship if their mentors also report learning from them?

Research Question 6: How do mentor inputs (e.g., performance, motivation, similarity) impact protégé learning? Likewise, how do protégé inputs (e.g., performance, motivation, similarity) impact mentor learning?

A final recommendation for future research is to broaden the scope of protégé and mentor inputs examined as predictors of learning. As our literature review documents, a relatively small number of studies have examined mentor and protégé inputs. Promising areas for future research include traits associated with effective interpersonal functioning (e.g., agreeableness, secure attachment style, emotional stability, emotional intelligence) and learning (e.g., learning goal orientation, openness to experience, conscientiousness).

Research Question 7: To what extent do protégé and mentor personality traits relate to learning among both mentors and protégés?

39.8 Concluding Thoughts

In closing, the current chapter provides a comprehensive discussion of the current empirical literature on learning in mentoring. We also develop a framework that integrates what we know from the empirical research on mentoring and established theories of learning and development. We hope that this sparks additional research on the potential for learning in mentoring relationships and contributes to a deeper understanding of the growth potential that mentoring holds for mentors and protégés alike.

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(asterisk indicates articles included in the narrative review)

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Chapter 40

The New Professionalism: An Exploration of Vocational Education and Training Teachers in England

James Avis and Kevin Orr

Abstract In the current conjuncture important themes surrounding models of professional learning are those that stress the significance of practice-based workplace learning as well as the salience of on-going CPD. There is some articulation between this work and conceptualisations of a new professionalism that seeks to overcome the ‘elitism’ of earlier forms. There is also a link with a critique of impoverished conceptualisations of professionalism rooted within audit, performativity and standards. These newer forms seek to develop models of accountability that engage with the broader community and are characterised by democratic relations. Notions such as dialogic and ecological, or indeed models of preferred professionalism capture these ideas, as do discussions of hybrid inter-professionalism. The chapter interrogates these notions together with their significance for conceptualisations of professional learning. In addition it problematises conceptualisations of the ‘new’ professionalism. It could be argued Thatcherism interrupted all sorts of radical projects, amongst which were those orientated towards the development of emancipatory and dialogic models of teacher practice. These practices could be construed as embodying forms of dialogic and collective professional learning, that in some ways anticipated current debates. The chapter concludes by arguing that these approaches can only take us so far and that they need to be aligned to a radical transformative politics to fulfil their potential. For without such a stance they can easily be appropriated by forms of conservative modernisation.

Keywords Vocational education and training • Professionalism • Learning

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40.1 Introduction

In this chapter we have set ourselves a specific task, to explore the affordances for professional learning encountered by vocational teachers (i.e., those involved in vocational education and training). This will be complemented by a consideration of the implications this has for implementing and supporting the professional learning of these teachers. Although our analysis is not restricted to England, this nation is used as a case in point. The neoliberal embrace has perhaps been taken to its furthest in England and other Anglo-Saxon market-driven economies (US, Australia, New Zealand), with echoes now being found in continental Europe and elsewhere as a consequence of the present socio-economic crisis. Although this crisis reflects the over accumulation of capital (Harvey 2010; Avis 2013) it has been rendered visible as a result of the 2008 banking crisis. For some writers the difficulties facing Western economies not only reflect the capitalist cycle of boom and bust but also the shift in economic power towards the BRIC (Brazil, Russia, India, China) nations. Whilst the above may seem somewhat far from an interest in the affordances for professional learning available to vocational teachers, such contextualisation is important. Henriksson (2012) has described the reduction in time from three and a half years to two years for the preparation of vocational teachers in Finland due to cuts in funding resulting from the economic crisis. Brown et al. (2011) in their analysis of the apprenticeship system in Germany similarly point to the reduction in time allocated for training. Niemeyer (2010) has illustrated the reframing of German vocational education and training towards young people facing unemployment. In these instances, there are parallels that can be drawn with the United Kingdom with respect to reducing the cost of training (Avis et al. 2013) but also the need to respond to youth unemployment. These instances, in turn, are related to the global economic context within which education and training is set. This context constitutes the terrain vocational teachers confront, albeit mediated by national states, issues of locality as well as institutional and organisational practices. The point being that the socio-economic context of austerity partly shapes the affordances for professional learning these teachers encounter.

It is important to explain our conceptualisation of vocational teachers because of the slippage in the way vocational education and training can be mobilised. For example, it could be argued that the elite universities in the UK provide a vocational education that leads to top positions in the city, civil service, politics and so on. In addition, higher education is currently being enjoined to play its role in promoting the knowledge economy and in developing the requisite skills (EU 2002, 2010; BIS 2011). Universities are to become business facing, vocationally orientated and are to imbue students with appropriate dispositions for personal success, thereby contributing towards economic competitiveness. In this chapter, our conceptualisation of vocational teachers is somewhat tighter, we are focusing upon those working within English Further Education,¹ which is akin to Community Colleges in the US,

¹English Further Education nestles between the end of compulsory schooling and degree level study, and has been orientated towards the provision of non-advanced vocational/technical and general education, as well as adult and community education. It has never been an easily definable

Technical and Further Education Colleges in Australia and allied provision in New Zealand. In addition, we have in mind teachers working in vocational schools and similar provision in continental Europe. We also include those involved in vocationally orientated workplace learning as well as the activities of private training providers within the learning and skills sector.

It would be useful to provide working definitions of professionalism and professional learning. Professionalism is minimally concerned with performing an occupational role appropriately whilst professional learning is that arising in professional settings. Importantly, these constructions are temporally and situationally specific, that is to say, their particular meaning and the ways in which they are accented varies over time and place. Some writers have been careful to distinguish between staff development and professional development. The former is training or learning entirely directed by the employer towards the needs of the organisation; the latter is largely directed by teachers towards their own professional needs (Troyer 2002, p. 2). However, there may be significant overlap between these two and one is not necessarily more worthwhile than the other. Nonetheless, the question of who controls what professional learning is encouraged and funded, upon which the distinction between staff and professional development is based, remains significant. We return to this theme later because it illuminates the affordances for the professional learning of vocational teachers. In times of fiscal rectitude, there is a lurch towards an instrumentalism that prioritises the immediate needs of teachers and the institutions in which they work, whether these arise as a response to the legal context or to specific pedagogical challenges.

40.2 The Vocational Teacher

The archetype of this teacher is one involved in craft training. However, the category is wide ranging flowing from hairdressing to, for example, others orientated towards financial services etc. Nevertheless, a defining feature is that these teachers, unlike schoolteachers, are marked by a dual professionalism, the one derived from their role as a teacher and the other from their former occupation (Robson 1998).² Such practitioners can face a contradictory pull between these two forms of professionalism that can mediate the type of learning derived from their practice. A business studies teacher in Wahlberg and Gleeson's Further Education (FE) study commented on the loss of a disciplinary-based identity and status. They wrote, "he used to be 'an Economist', then a lecturer, but that one of the changes that occurred recently is that he has become 'a teacher'" (2003, p. 437). This particular teacher had in mind a pejorative notion of teaching as child minding. Thus, for example, Biemans et al. (2009) discussed the significance of a move towards a coaching role

sector – characterised by diversity, shifting boundaries and is delivered not only within FE colleges but by a variety of providers. FE provision can range from basics skills to degree level work, with providers being marked by their particular histories as well as their local and regional contexts.

²Inevitably, there will be some schoolteachers who are dual professionals.

for vocational educators in school based provision in Holland that required a transformation in their practice and the development of a new role and allied skills (also see Ketelaar et al. 2012). Niemeyer (2010) has also discussed similar changes facing educators in Germany which required a shift in their practices away from vocational specialism towards the development of generic skills that would prepare young people for work. These changes were a response to increasing rates of youth unemployment, the expansion of flexible labour markets as well as the collapse of Fordist work relations premised upon lifetime employment with a single employer. As with those working within vocational education in general, such changes impact upon teachers' identities as well as the scope and form of their learning, which is in turn interrelated with practice, and in this way opens-up and closes-down particularly forms of learning.

The chapter comprises a number of sections, with the following addressing older models of professionalism and drawing out their relevance to teaching in general and vocational education in particular as well as understandings of professional learning. These approaches are important as they reflect relatively early constructions of professionalism against which vocational teachers can be compared, as well as providing qualitatively different orientations towards professional practice. In addition, they provide a contrast with more recent dialogically informed conceptualisations (Crook 2008). Functionalist and trait approaches and Johnson's (1972) discussion of professions and power will be explored briefly. This discussion is set within its socio-economic context – namely Fordism. This could be thought of as the dominant economic imaginary used to describe Western economies following the end of the Second World War, which began to unravel in the 1970s. This context is important as it is one characterised by a degree of stability in which the notion of state legitimated teacher professionalism was significant. Its origin will be briefly discussed as this allows an analysis of its collapse in the post-war period and is allied to the emergence of alternative models of teacher professionalism. These models are explored below but as with the previous section the discussion is located within its socio-economic context. Notions of the risk society, 'precariousness' and Post-fordism will be used to frame the discussion. A number of paradoxes are explored surrounding the development of standards, notions of competence when set against the emphasis placed upon lifelong learning, the salience of creativity as well as the role of knowledge workers in knowledge based economies. The contradictions surrounding neoliberalism, performativity and audit will be examined alongside the relationship of these practices to professional learning. Conceptualisations of the 'learning professional' and that of the dual professionalism of vocational educators will link this to the subsequent section.

An important theme surrounding current models of professional learning are those that stress the significance of practice-based workplace learning as well as the salience of Continuing Professional Development (CPD). There is some articulation between this later work and a new professionalism that seeks to overcome the 'elitism' of earlier forms, as well as impoverished conceptualisations of these linked to restrictive notions of competence, audit, performativity and standards. These newer forms seek to develop models of accountability that engage with the broader

community and are characterised by democratic relations. Notions such as dialogic professionalism, ecological or indeed a preferred professionalism encapsulate these ideas. This chapter problematises such conceptualisations. Alongside this discussion is a concern with the affordances for learning offered by the conditions in which vocational education is set. A number of themes will be explored. Hodkinson (2009) has developed Fuller and Unwin's conceptualisation of restrictive and expansive workplace learning environments, applying these to teachers. This sits alongside an engagement with Engeström's (2001) activity theory which is used as a heuristic device and Adler et al.'s (2008) discussion of professional work and collaborative communities. In different ways, these accounts address the new conditions faced by teachers and the potential for professional learning. These ideas have some affinity with Post-fordism and articulate to newer conceptualisations of professional practice that seek to move beyond the elitism of older models towards more democratic and dialogic forms. It is important to recognise that as with the fluidity surrounding models of professionalism, so too with notions of learning and the way in which we make sense of these. Arguably these ideas are in some sense coloured by a notion of efficiency which in turn is derived from neoliberalism which impacts upon theorisations of professionalism and professional learning.

Although it could be suggested that progressive models of professionalism were emerging in the 1970s, it could be argued that Reagan's and Thatcher's neoliberalism interrupted all sorts of radical projects especially amongst those orientated towards the development of emancipatory and dialogic forms of teacher practice. Such practices could be construed as embodying forms of dialogic and collective professional learning that in some ways anticipated current debates. The chapter concludes by arguing that these approaches can only take us so far and that they need to be aligned to a radical transformative politics to fulfil their potential, that is to say, a commitment to social justice that extends beyond a capitalist logic.³

40.3 Models of Teacher Professionalism and Affordances for Learning

This section considers older models of professionalism, their relevance to teaching in general and vocational education in particular, as well as their significance for professional learning. This discussion is set within Fordism and provides a useful contrast with newer constructions of professionalism. Yet, we do not wish to enter into a

³ It is important at this stage to introduce a caveat concerning the breadth of this chapter, particularly in relation to what one reviewer referred to as 'the elephant in the room', namely the affordances for learning of web-based resources. These are clearly significant and could constitute a chapter in their own right. If we were to address these questions with the seriousness they deserve we would have found ourselves engaging with Italian workerism and the manner in such arguments are played out in current theoretical discussions (see for example, Cederström and Fleming 2012; Peters and Bulut 2011; Berardi 2009; Vimo 2008).

wide ranging discussion of professionalism. Instead, our goal is merely to draw out a number of key features surrounding professionalism and their relevance to vocational teachers. There is a loose affinity between the writings of Abbott (1988), Parsons (2012 [1939]) and Millerson (1964). In the case of the latter the professions were deemed distinctive as they shared a number of characteristics or traits that set them apart from other occupations. They were thought to be marked by altruism, autonomy, codes of professional practice as well as the possession of specific knowledge and skill etc. Parsons, and latterly Abbott, developed a more systemic approach, in this instance the features of professionalism are theoretically related within a social system. Thus for Parsons (2012) professionals perform particular functions that contribute towards the smooth running of society, with Davis and Moore (1945) providing a justification for the rewards associated with high status occupations. In contradistinction to such arguments are those emphasising the relationship between professions and power as found in the work of Johnson (1972). Allied to these debates is the suggestion that professions are self serving. This argument is manifest in both left and right wing analyses, in the case of the former, Illich's (1977) work would stand as an example and with respect to the latter, Thatcherite and New Right critiques of professional/producer capture (see for discussion Education Group II 1991; Demaine 2000; and for a current manifestation Ferguson 2012). In addition, a particular feature of these debates concerns legitimated teacher professionalism which has been developed under varying historical conditions in different societies. This is the notion that teachers have autonomy in the classroom on the proviso that politics are removed from pedagogic processes. In the UK, legitimated teacher professionalism developed in the inter-war period (1920s and 1930s) as a bulwark against socialism⁴ (Grace 1987), whereas in other societies this form of professionalism developed in the post-war period as a response to fascism. There are at least two points to make here. Firstly, autonomy in the classroom was constrained in a number of ways, not least as a result of the requirement to operate within particular curriculum frameworks. Secondly, in the late 1970s in societies such as the UK concerns were increasingly expressed by the right about professional capture and the politicisation of the classroom by leftist teachers. Needless-to-say these issues were rather more rhetorical and ideologically driven than 'factually' based, but they have had an impact on conceptions of vocational teacher professionalism.

There are a number of debates that flow from the preceding discussion that bear upon vocational teachers and their professional learning. These teachers will have developed specialised skills and knowledge through the occupational training offered

⁴Grace (1987) cites White to illustrate the way in which teachers and local autonomy were conceived as a bulwark against socialism in the UK in the 1920s/1930s. "If parliament still controlled the content of education, the socialists would change the regulations... they would be able to introduce curricula more in line with socialist ideas. To forestall this it was no longer in the interests of the conservatives to keep curriculum policy in the hands of the state... if they could devise a workable system of non-statutory control the conservatives had everything to gain and nothing to lose by taking curricula out of the politicians hands." (White cited in Grace 1987, p. 207). Interestingly it was under a Conservative government that a national curriculum was introduced in 1988, some 100 years after the UK's continental rivals.

Table 40.1 Characteristics of fordism and post-fordism

Fordism	Post-fordism
<i>Economy competition and production process</i>	
Protected national markets	Global competition
Mass production of standardised products	Flexible production systems/small batch/niche markets
Bureaucratic hierarchical organisations	Flatter and flexible organisational structures
Compete by full capacity utilisation and cost cutting	Compete by innovation diversification, sub-contracting
<i>Labour</i>	
Fragmented and standardised work tasks	Flexible specialisation/multi-skilled workers
Low-trust/low-discretion majority employed in manufacturing sector/blue collar jobs	High-trust/high-discretion majority employed in service sector/white collar jobs
Little on the job training little formal training required for most jobs	Regular on the job training greater demand for knowledgeable workers
Small managerial and professional elite	Growing managerial and professional service/class
Fairly predictable labour market histories	Unpredictable labour market histories due to technological change and increased economic uncertainty
<i>Politics and ideology</i>	
Trade Union solidarity	Decline in trade union membership
Class-based political affiliation	Declining significance of class-based politics
Importance of locality/class/gender-based lifestyles	Fragmentation and pluralism global village
Mass consumption of consumer durables	Individualized consumption/consumer choice

Source: Brown and Lauder (1992), Table 1.1, p. 4

to practitioners in their particular field. On the route to becoming teachers they may have followed a teacher training programme or combine this, as is the case in the UK, with work in the vocational education sector. In this way, they would have undergone a programme of professional learning that underpinned their pedagogic practices. Within the UK, the pedagogic development of vocational teachers remains at a relatively low academic level in comparison with continental Europe. This circumstance, in turn, reflects the low status accorded to the vocational pathway in the UK. For example, in contrast to school teachers, only recently has it become mandatory for teachers working in Further Education colleges to have a teaching qualification, and at the time of writing it seems that this requirement is to be truncated.

The broader context of vocational teaching in the post-war period was that of Fordism and carried with it very particular implications for professional learning. Table 40.1 is drawn from Brown and Lauder (1992) and serves to describe the key features of Fordism and Post-fordism.

Fordism was set alongside the social democratic welfare state that was a feature of European social relations in the years following the end of the Second World War. This was a time of mass production and consumption of standardised goods, the presumption of a steadily increasing standard of living when the notion of life time employment with large employers was prevalent. The car industry perhaps best

illustrates Fordist industrial processes, characterised by semi-skilled and detailed division of labour. Allied to Fordism was the notion of one-off training for mass production workers which was complemented by iterative and slowly developing practice for skilled craft workers (see Sennett 2009). What then does this contextualisation have to say about vocational teachers and their professional learning? There is the implication that these teachers' vocational learning will have arisen and been concentrated at a particular point in time. Gleeson and Mardle (1980) study of an English FE college illustrates this implication, with teachers being rather more engaged in the occupational socialisation of their students than in imparting up-to-date technical knowledge. Not dissimilarly, Avis (1988) noted similar tendencies in his study of an FE college, with vocational teachers dictating to their students from outdated notes. In other words vocational skills and training will have been acquired early in the teacher's working life and thus be restricted to what was learned then, with pedagogic skills being developed on the move into teaching. Again, the presupposition is that the development of vocational and pedagogic skills will have been acquired at a particular point in time and subsequently absorbed and honed through vocational and pedagogic practice. This is not to gainsay the insights of those researchers who have addressed workplace learning and argue that work and learning cannot be separated (Malloch et al. 2011). Rather the point is to set this within Fordism so as to be able to contrast this with Post-fordism in relation to training and professional development, thereby acknowledging that the affordances for learning are shaped both by the socio-economic context and workplace practices. The implication here is that Fordism and Post-fordism are marked by qualitatively different relationships and therefore offer different affordances and conceptualisations of learning as well as professionalism.

Following the 1970s, Fordist work relations became transformed. It was suggested there was a shift towards labour processes marked by increasing flexibility and adaptability. Initially writers such as Brown and Lauder (1992) celebrated the progressive possibilities that flowed from these changes which held the promise that workers would acquire greater control over the labour process, experience enhanced levels of job satisfaction and would be able to express creativity at work. Some of these ideas were linked to notions of connectivity as well as to collective intelligence. Whilst connectivity is now widely used in relation to complexity theory, Young has discussed the notion in relation to connective specialisation and the demands this places on the curriculum for teachers in general but also for vocational educators (and see Mulgan 1998; Leadbeater 2011). Young's aim was to overcome the division between academic and vocational education so that the latter gained the status it merited. It is important to acknowledge the context in which he was writing and the systematic devaluation of vocational education and training in England. His construction of the curriculum and pedagogic processes has implications for teachers' professional development and the affordances for learning. He writes:

In the sense used here, connective specialisation is concerned with the links between combinations of knowledge and skills in the curriculum and wider democratic and social

goals. At the individual level it refers to the need for an understanding of the social, cultural, political and economic implications of any knowledge or skill in its context, and how, through such a concept of education, an individual can learn both specific skills and knowledge and the capacity to take initiatives, whatever their specific occupation or position... As a definition of educational purpose it aims to transcend the traditional dichotomy of the 'educated person' and the 'competent employee' which define the purpose of the two tracks of the divided curriculum [that is the vocational and academic]. (Young 1993, p. 218)

Reflecting the democratic thrust of these ideas Brown and Lauder (1992) cited Lacey's work on collective intelligence approvingly;

Skills and talents are concerned with solving problems within already existing paradigms and systems of knowledge. Intelligence has to do with understanding the relationship between complex systems and making judgements about when it is appropriate to work within existing paradigms and when it is appropriate to create new courses of action or avenues of thought... Collective intelligence [is] defined as a measure of our ability to face up to problems that confront us collectively and to develop collective solutions. (Lacey 1988, pp. 93–94)

However, it soon became apparent that the progressive thrust of these ideas was illusionary. Flexibility and adaptability rather than facilitating empowerment became ideological glosses for the intensification of labour (see Bourdieu 1998; Beck 1999), processes acutely felt by teachers in the English Further Education sector (Randle and Brady 1997a, b) and in other social formations wedded to neoliberalism (the US, Australia and New Zealand). In current conditions of austerity such processes are being similarly experienced in Europe (Henriksson 2012; Niemeyer 2010; Marazzi 2011, p. 113; and see Bezes et al. 2012). Despite protestations Post-fordism became associated not only with adaptability and flexibility but also with notions linked to the knowledge society. The 'knowledge society' was thought to bring with it a transformation of professionalism allied to the increasing importance attributed to knowledge work. Advisedly Brown et al. (2011) point out that whilst knowledge may be increasingly important for production, it does not necessarily follow that knowledge workers will be highly paid. They suggest, as with other forms of labour, there is a move towards the standardisation of knowledge work as a result of the development of digital technologies. They refer to this as digital Taylorism which leads to a polarisation amongst knowledge workers with some being highly paid and part of a global elite, whilst the majority are subject to the standardisation of their labour process and for those in the West, a declining income and standard of living – the spectre of a high skill, low wage nexus.

How then do such processes play out for the professional learning of vocational teachers, not just in relation to digital Taylorism but also to arguments addressing the knowledge economy? If we were to remove from the debate an ideological reading of Post-fordism and the knowledge society there are features that presage the transformation of the labour of vocational teachers with respect to adaptability, flexibility and casualisation.

40.4 A Case in Point: English Vocational Teachers

In this section, we consider vocational teachers and the affordances provided for their learning in the current socio-economic situation. A consideration of these teachers is salutary as their experiences foreshadow some of the more negative features of neoliberalism and stands as a warning to other societies minded to follow a similar route. There is a paradox between the rhetoric surrounding Postfordism, the knowledge society and the lived experience of teachers working in the English FE sector. The rhetoric calls for adaptability, flexibility and creativity but for many teachers this stands in contrast to the demands of the performative and audit cultures in which they are placed. There is a significant body of work that explores the lived experience of those working in the sector, which points towards a number of the features.

- loss of control
- intensification of labour
- increase in administration
- perceived marginalisation of teaching
- stress on measurable performance indicators
- (cited in Avis 1999, p. 251)

(and see, Ainley and Bailey 1997; Elliott 1996; Gleeson and Shain 1999a, b; Hodkinson 1997; Jameson 2010; Kerfoot and Whiteside 1998; Page 2011a, b; Randle and Brady 1997a, b; Shain and Gleeson 1999.) There are moves towards the surveillance of teaching through processes of institutional audit and self-assessment. Whilst there has been some retreat from the micro-management of targets by the central state, this has been accompanied by the increasing importance attached to international benchmarking. This can be seen in the OECD's Programme for International Student Assessment (PISA) which provides data that enable international comparison of the performance of students across different national systems. Notwithstanding the problematic nature of such data, they do serve a performative purpose and provide benchmarks against which institutions can compare themselves (Simons 2010). As a result of the easy availability of such data it becomes less imperative for the central state to micro-manage such performative processes.

Alongside performativity and audit, vocational teachers encounter an increasing emphasis on teamwork and models of teaching and learning that centre the learner rather than the teacher. Even the architecture of some English FE colleges reflects this emphasis, with newly-built 'Learning Zones' which contrast with the tiny spaces allowed for teachers' offices (Orr 2012). The emphasis in English vocational education on the teacher as a facilitator of learning carries with it an implication of de-skilling. For Randle and Brady (1997a, b), such teachers are subject to proletarianisation, by which they have in mind processes relating to deskilling, loss of control and autonomy over their labour process. For these writers teacher professionalism has been transformed and with it the affordances for learning. The implication is that teachers learn how to operate effectively, or at least minimally

survive, within a performative culture. There are two points to be made here that derive from the work of Gleeson, Shain and Wahlberg (Gleeson and Shain 1999a, b; Shain and Gleeson 1999; Wahlberg and Gleeson 2003). Firstly, these writers draw our attention to ways in which teachers respond to conditions of performativity and audit, discussing their strategic, willing and unwilling compliance. In the case of the former, teachers attempt to work on the 'good side' of the conditions they face and to wrest advantage, through the development of various forms of co-operative practice, for their learners, institutions and themselves. In addition, Gleeson et al. (2005) suggest that whilst we can conceive of the changes facing these teachers as representing proletarianisation, at the same time these processes could lead to a re-professionalisation that necessitates professional learning. This is perhaps best illustrated by strategic compliance and the strategies teachers have developed to defend their educational values. Gleeson and Shain (1999a, p. 482) have described strategic compliance as "a form of artful pragmatism which reconciles professional and managerial interests". Sharing resources would be a case in point as would working cooperatively as a means to reduce preparation workloads whilst also serving the interests of learners. Strategic compliers "did not comply for the 'sake of their own skins'" (Gleeson and Shain 1999a, p. 460) but make decisions whether to conform with the managerial regime based upon the needs of learners. Reprofessionalisation is also a manifestation of the enlargement of teachers' work. We briefly illustrate various developments that need to be located within the socio-economic context of the sector, conditions of performativity deriving from the central state but also as a consequence of international benchmarking. We have already mentioned moves towards greater learner-centeredness with the teacher being positioned as facilitators rather than disciplinary experts. This shift necessitates the development of skills that are rather different to those associated with traditional didactics.

Ecclestone and Hayes (2008) have argued that there has been a therapeutic turn in pedagogic relations with teachers becoming more concerned with the wellbeing of students. The emphasis is that learners should develop positive self-esteem and feel good about themselves. Although this argument is overstated and is rather more suited to underachieving students,⁵ it does nevertheless point towards two features. Firstly, educational institutions, including FE colleges, are increasingly judged on the basis of student satisfaction surveys with teachers being enjoined to ensure that their classes and courses are ranked highly. In addition, and in a rather more benign

⁵Lingard et al. (2008) refer to this as a, "duality of policy [is] informed, arguably, by the state seeking to regulate different class interests and concerns. One set of strategies is designed to satisfy the possessive individualism of the advantaged, providing them with the positional goods to secure their relative advantage in the spaces of the mobile global economy. While another set of strategies that are creating an integrated and collaborative Children's Service is designed to provide 'wrap around' care and 14–19 vocational training to secure adaptation of disadvantaged children and families to the changing demands of local labour in its place. Thus we are possibly seeing a new correspondence between class structure, educational provision and differing local and global labour markets". (Lingard et al. 2008b, p. 14)

fashion, teachers are becoming more attuned to the emotional and social needs of learners which can place additional demands on time and emotional resources (see Hochschild 1983; Avis and Bathmaker 2004; Avis et al. 2011; Colley 2011). This shift represents an enlargement of the teaching role which carries with it an intensification of labour. There is an affinity between this enlargement of caring activities and notions of inter-professionality related to multiagency working whereby teachers liaise with a broader group of professionals to ensure the wellbeing of students. In the UK this sits alongside a state agenda concerned with safeguarding children and young people, in particular *Every Child Matters*⁶ and *Youth Matters*,⁷ both of which adopt a holistic view of learners, embedding them within multiagency settings and the broader community. The expansive role expected of teachers necessitates the acquisition of new understandings to develop their practice accordingly. Allied to this are concerns with the prevention of violent extremism, the development of citizenship, as well as addressing the specific learning needs of individual students (Avis et al. 2011).

This expansion of the teaching role has been accompanied by several contextual factors: the secular decline of British manufacturing, the casualisation of the FE sector's workforce and a shift in its gender balance leading to what some have argued is a feminisation of the sector (Simmons 2008). The lived experience of many of those working in the sector is that of audit, performativity and the intensification of labour alongside an increasing precariousness (see Orr 2012). Rather than matching up to a Post-fordist imaginary, teachers' experience is akin to what Brown and Lauder describe as Neo-fordism.

Neo-fordism can be characterised in terms of creating greater market flexibility through a reduction in social overheads and the power of trade unions, the privatisation of public utilities and the welfare state, as well as a celebration of competitive individualism. (Brown and Lauder 1996, p. 5)

Teachers feel "caught in a fast changing policy-practice dynamic in which their status has been 'casualised' and deprofessionalised by a process of market,

⁶Five outcomes are embedded in *Every Child Matters*:

- being healthy: enjoying good physical and mental health and living a healthy lifestyle
- staying safe: being protected from harm and neglect
- enjoying and achieving: getting the most out of life and developing the skills for adulthood
- making a positive contribution: being involved with the community and society and not engaging in anti-social or offending behaviour
- economic well-being: not being prevented by economic disadvantage from achieving their full potential in life. (DfES 2003, pp. 6–7)

⁷*Youth Matters* commenting upon four key challenges states these as being:

- how to engage more young people in positive activities and empower them to shape the services they receive;
- how to encourage more young people to volunteer and become involved in their communities
- how to provide better information, advice and guidance to young people to help them make informed choices about their lives; and
- how to provide better and more personalised intensive support for each young person who have serious problems or get into trouble. (DfES 2005, p. 5)

funding-led and managerialist reform” (Wahlberg and Gleeson 2003, p. 438). The real paradox is that these teachers are those who are also to address, in Guile’s (2010) terms, ‘the learning challenge of the knowledge economy’. Yet they encounter intensification of labour and increasing precariousness in employment which has a profound impact on opportunities for professional learning and is akin to a restrictive learning environment.

40.5 Expansive-Restrictive Learning Environments

We can explore these affordances for learning by utilising Hodkinson’s (2009) reworking of Fuller and Unwin’s (2004) continuum of expansive restrictive work-place learning environments, applying this to teaching (and see Evans et al. 2006, Fig. 3.2 p. 61; Hodkinson and Hodkinson 2005). Vocational teachers encounter features of this continuum in their working lives. There is an affinity between expansive learning environments, Post-fordism and Engeström’s (2001) notion of expansive learning, which he describes as “produc[ing] new forms of work activity” (2001, p. 139). There are a number of features to note in Table 40.2.

It has now become commonplace to align professional practice with learning, as Billett states:

learning is an ongoing and inevitable process arising from participation in work practice across working lives as individuals think and act in everyday activities at work. (2001, p. 20)

Table 40.2 Expansive-restrictive learning environments for teachers

Expansive	Restrictive
Close collaborative working	Isolated, individualist working
Colleagues mutually supportive of learning	Colleagues obstruct or do not support each others’ learning
An explicit focus on learning as a dimension of normal working practice	No explicit focus on teacher learning, except to meet crises or imposed initiatives
Supported opportunities for personal development that goes beyond school or government priorities	Teacher learning mainly strategic compliance with government or school agendas
Out of school educational opportunities including time to stand back, reflect and think differently	Few out of school educational opportunities, only narrow, short training programmes
Opportunities to integrate off-site learning into everyday practice	No opportunity to integrate off-the-job learning
Opportunity to extend professional identity through boundary crossing into other departments, school activities, schools and beyond	Work restricted to home departmental team within one school. Opportunities for boundary crossing only come with a job change
Support for local variation in ways of working and learning for teachers and work groups	Standardised approaches to teacher learning are prescribed and imposed
Teachers use a wide range of learning opportunities	Teachers use narrow range of learning approaches

Source: Hodkinson (2009), Table 13.1, p. 165

It is important to acknowledge that such learning is often construed as ‘learning through and for work’ (Billett 2011, p. 60). The ‘for’ is significant as it points towards a particular aspect of learning as applied to the workplace. Hodkinson’s contrasts expansive with restrictive learning environments suggesting that the latter places a limit on teachers’ learning. That is to say it is truncated and consequently teachers fail to develop their practice as fully as possible. In Hodkinson’s model there is little space for a broader understanding of the politics of professional labour and the work of vocational teachers within a capitalist society. Coffield and Williamson (2011) comment on the conditions faced by teachers in the UK.

Is it any wonder that so many teachers feel demoralised, when as Dan Hind [2010, p. 206] puts it, they have ‘become conditioned to believe that they are incapable of effective action, that achieving change is someone else’s responsibility?’ (2011, p. 64)

Although this is an exaggeration it nevertheless represents a form of learning that tends to be overlooked or at least played down in the literature (but see Avis 2010) and in this instance teachers may learn to be isolated and powerless (see also Avila de Lima 2003). The failure to identify this form of self-limiting learning derives from a moral imperative to recognise and validate learning at work as a result of a commitment to a particular understanding of social justice (Boud and Symes 2000, p. 18). Historically learning at work has tended to be devalued at the expense of certified learning taking place in educational institutions. In this case class privilege deriving from socio-economic position has been mapped onto the learning arising at particular locations, such as universities, with consequences for educational opportunities and social justice. For writers such as Billett (2005) and Boud and Symes (2000) the certification and validation of workplace learning seeks to remedy this injustice.⁸ These arguments are particularly salient in the English context where vocational education and its teachers have been devalued and accorded low status.

There are a number of features of Hodkinson’s model of Expansive-Restrictive environments that raise questions about the affordances for professional learning available to vocational teachers. She draws our attention to the importance of learning opportunities outside the employing institution referring to, “out of school educational opportunities including time to stand back, reflect and think differently” (Hodkinson 2009, p. 165). This stands as a corrective to earlier conceptualisations of workplace learning that emphasise its specificity, situatedness and uniqueness allied to the assertion that there is limited transfer across sites as a result of the peculiarities of workplaces. Billett’s (2008) research on hairdressers would be a case in point, as would Brown et al.’s (1989) discussion of school learning. The latter suggest that what one learns in school is to be a pupil rather than for example becoming a mathematician. Hodkinson, together with other writers, would acknowledge this specificity and would challenge the notion of the direct transfer of learning from one site to another. Instead they mobilise a notion of recontextualisation

⁸ Billett writes, “finding means to legitimately and authoritatively recognise skills acquired through work hold the prospect of providing *just arrangements* for these otherwise disadvantaged workers as well as those requiring recognition throughout their working life”. [my emphasis] (2005, p. 944)

whereby learning is engaged with dialectically to suit the particular circumstance in which it is marshalled (see Evans et al. 2006; Guile 2006).

Significantly restrictive learning environments reflect quasi Fordist settings and the accompanying limitations this places on professional learning. Paradoxically, this also anticipates the technicisation of pedagogic relations through the development of digital Taylorism, the standardisation of knowledge work as well as the development of web-based materials. Relatedly, these processes raise questions about the moral purpose and underlying values present within educational institutions such as FE colleges. This may be particularly pertinent in societies attached to Anglo-Saxon models of capitalism embedded in neoliberalism that play down the broader educative role of vocational teachers. In conditions of austerity the broader educative affordances of vocational education may become increasingly vulnerable as fiscal budgets become tighter.

Hodkinson points towards collegiality, collective work and dialogue involved in expansive contexts and draws our attention to “close collaborative working” with “colleagues [being] mutually supportive of learning” (2009, 165). For much research associated with professional learning a key affordance is collectivity and dialogue that facilitates expansive learning; a theme present in the work of Adler and Engeström (and see Avis and Bathmaker 2006; Gleeson et al. 2005). These arguments are located within debates concerned with Post-fordism and notions of the knowledge economy that emphasise the importance of professionalism, community and collaboration.

40.6 Professionalism, Community and the Affordances for Learning

For Adler and Engeström collaborative practice, and in this sense community, is central to learning ‘for and through work’. In contradistinction to our earlier argument Adler et al. (2008) suggest that the knowledge economy places a premium on learning associated with innovation and creativity. In addition they argue that this is intimately related to the development of the forces of production which lie outside the antagonisms surrounding capitalist labour processes. This argument sets itself apart from those of Beck (1992) and Giddens (1994, 1998), who draw on notions of the risk society and reflexive modernisation (and see Franklin 1998) suggesting that we face conditions of radical and manufactured uncertainty. That is to say, as a result of human activity we generate or manufacture a series of dangers for wider society. We only need to reflect on issues such as environmental degradation to illustrate this. In addition they argue that in the past expert knowledge was deemed to be authoritative but this is no longer the case. The result is a condition of radical uncertainty, whereby knowledge claims are met with scepticism. The work of Beck and Giddens is premised on the development of individualisation that is partly a consequence of the breakdown of community. For professional workers this is

reflected in the fragmentation of their role. A vocational teacher may be orientated towards pastoral work whereas others might be developing the work-based skills required by trainees in a particular workplace, with yet others involved in prevocational provision (Avis et al. 2011). In addition the location of professional workers within a hierarchical division of labour in an employing organisation similarly supports individualisation. Against these arguments Adler et al. (2008) posit the continued salience of community. They suggest that “the ascendancy of market and hierarchy principles in the organization of professional work has not diminished the role of community” (p. 360) and that these three principles, that is to say the market, hierarchy and community are becoming more salient through their interrelationship. For Adler et al. arguments that posit the proletarianisation or reprofessionalisation of professional work, miss the point, suggesting “effective knowledge-work needs community” (2008, p. 363). In a comment resonant with Guile’s (2010) they write,

Capitalist development is increasingly knowledge-intensive knowledge-workers need community within which to learn the craft elements of their skill sets and within which they can continually advance and share knowledge, both theoretical and practical (Lave and Wenger 1991). The forces of capitalist competition themselves simultaneously tend both to destroy and to recreate community (Adler 2001). (Adler et al. 2008, p. 363)

The above have some purchase when applied to vocational teachers but need to be framed by the specific conditions these professionals encounter. These conditions reflect proletarianisation and reprofessionalisation which are being deepened by austerity measures resulting from the economic crisis. They also need to be located within an analysis that acknowledges digital Taylorism. Livingston (2008) argues that whilst the skill levels of the workforce have risen in the post-war period these remain underutilised, intimating towards increasing levels of underemployment (p. 22). This rests with the spectre, in the West, of high skill low waged employment (Brown et al. 2011). This is significant for a number of reasons, not least is the recognition of the social processes and power relations surrounding what counts as knowledge and skill. This in turn influences what is considered to be valid professional learning. Teachers through their vocational experiences will have developed skills and knowledge, but the extent to which these are recognised will be influenced by class and gender (Phillips and Taylor 1980).

Adler et al. also suggest that,

Traditional professional values of autonomy are being challenged by the demands for collaboration in bureaucratically structured service delivery and collective process improvement. (Adler et al. 2008, p. 362)

Although such processes are contradictory and play out differently for specific groups of workers they nevertheless impact upon teachers. Guile and Lucas together with other writers suggest the notion of the ‘learning professional’ would overcome the divisions found amongst vocational teachers. It would open-up forms of Identity and with it community, anticipating collaborative relations. The ‘learning professional’ has an expansive understanding of pedagogic processes that veers towards a more holistic stance. For Guile and Lucas (1999) these teachers overcome vocational and disciplinary differences as a result of their commitment to pedagogy, and

in this sense constitute an expanded community. This position is echoed in debates addressed earlier that discussed inter-professionality and are pivotally linked to the affordances for professional learning. These ideas are also reflected in Engeström (2001) model of developmental work research. At its simplest, participants who hold different positions within an activity system explore its tensions, disturbances and contradictions. An activity system could be the institution delivering vocational education, or constituted by local stakeholders in regional networks and so on. Learning, new practices and professional identities emerge through dialogue and attempts to resolve the tensions found within the activity system. As with Adler, Engeström plays down issues of power.

There are several points to be made about the preceding. The first addresses power. Whilst it may be appropriate to analytically separate the development of the forces of production from social relations, this may be a step too far as both are intimately connected. In Engeström's work, there is a tendency to veer towards a consensual stance that views the resolution of contradiction as benefiting all participants in an activity system. This is overstated, but is partly a consequence of the way in which Marxist ideas have been mobilised to buttress his argument. There is also the danger of what Andy Hargreaves (1994) describes as contrived collegiality – or in this instance a contrived collaborative community formed as a result of management power based at best on a grudging acquiescence of the wider workforce. The hackneyed allusion to communities of practice to describe all manner of workplace groupings may be another illustration of this sort of contrivance. Here too, the distinction between staff and professional development may be worth recalling, with their varying affordances for learning.

In addition, the affordances for learning are socially situated. This is especially so in relation to pedagogic processes. Biesta et al. (2007) argue that 'what works' in the classroom 'is often localised and context specific' and that what works for one teacher with a particular group of students may not transfer readily to another. Hammersley (2001), whilst discussing evidence-based practice, has stressed the impossibility of educational theory to capture the complexity of the classroom. Hargreaves (2004), as a result of his emphasis upon development over research, similarly stresses such complexity (p. 147). These analyses point towards the complexity and situational specificity of the processes they explore. Their significance for the current discussion is that they indicate a similar complexity in the affordances for professional learning.

40.7 Affordances for Learning

Whilst some claim professional work and learning is distinctive because of the levels of internal and external regulation of knowledge (Fenwick et al. 2012, p. 1), vocational teachers at best operate at the margins of such work with respect to their dual professionalism. These teachers rarely consider FE colleges as providing a site for their own learning (though see Orr and Simmons 2010). Importantly there is a

stronger affinity between these teachers and the argument that calls for a recognition of workplace learning as an element of social justice. This is particularly the case in the UK where vocational teachers are accorded low status, having their autonomy and independence heavily circumscribed by the state. In this section we address the affordances for professional learning available to these teachers and by default consider questions of support and implementation.

Engeström's activity theory offers a starting point as it draws together a number of elements that illustrate the affordances for learning; the nature of the activity system in which the teacher is located, its division of labour and the relationship between participants. The teacher is placed in a pattern of relations that influence their response to the activity system of which they are a part, which in turn is partly shaped by the wider socio-economic context. Billett (2009) draws our attention to what he describes as personal epistemologies,

defined as individual's ways of knowing and acting arising from their capacities, earlier experiences, and ongoing negotiation with the social and brute world, that together shape how they engage with and learn through work activities and interactions. (2009, p. 11)

Personal epistemologies can be loosely linked to Bourdieu's notion of *habitus*⁹ and individual dispositions towards learning and the affordances these offer. This relationship could be extended to encompass the materiality of the socio-economic context and the competitive strategies developed therein (Solow 2008). Personal epistemologies may open-up or close-down possibilities for learning but these in turn will relate to the wider socio-economic context as well as to the institution in which the individual is located. This may be demonstrated in relation to the professional learning of vocational teachers in England where Government agencies have emphasised the importance of professional 'skills' or in the national standards for these teachers which are rooted in a narrow conception of competency (LLUK 2006). Winch (2010, pp. 45–46) has observed the British concept of skill has been diluted to "a conception of behaviour" which evacuates "all sense of intention or purpose". Such a reductive understanding of skill can significantly restrict affordances for meaningful professional learning among individual teachers who may only be encouraged and funded by their institutions to attend courses on, for example, behaviour management or attendance monitoring. This is all the more prevalent when such training relates to statutory requirements, such as student safeguarding.

We have described how the social and economic context associated with the risk society, and post-fordism has impacted upon the role of vocational teachers and the restrictions this society places on professional learning. Recognising this is crucial to ensure that individual teachers are not blamed for what are systemic failings that curtail affordances for learning. Nevertheless, vocational teachers should persevere in seeking out and defending opportunities for professional development. So, how might meaningful professional learning be supported and implemented? The work

⁹Bourdieu describes *habitus* as a person's set of individual dispositions and behaviour; it is 'a product of the incorporation of objective necessity' or having a 'feel for the game' (1990, p. 11). This understanding sees learning as a situated social practice that leads to change in the individual and which may be seen in the use of language and the making of professional judgements.

of Stronach et al. (2004) on the professionalism of nurses and schoolteachers may be helpful, especially what they term ‘ecologies of practice’, which “refer to the sorts of individual and collective experiences, beliefs and practices that professionals accumulate in learning and performing their roles” (p. 109). Ecologies of practice are necessarily collective and as Stronach et al. argue, exist in tension with the “economy of performance” characterised by notions of effectiveness and audit through performance indicators, such as those discussed above, which “are eventually demotivational in their effects” (p. 131). This conception of ecology of practice recognises that professional learning cannot be coerced but grows organically from within groups of workers, in this instance vocational teachers working together and seeking to develop practice. In some respects, this process is akin to strategic compliance but could also veer towards collective resistance against some of the more negative features of performativity. Professional learning, as opposed to staff development, is primarily instigated by individual professionals rather than by employers.

Such an understanding of professional development implies a conception of learning within what Hager (2004, p. 246) terms the “emerging paradigm”, which suggests that learning is a process leading to “the creation of a new set of relations in an environment” by changing learners and the environment. For Individuals and teams learning is characterised and evidenced by the ability to make judgements (pp. 248–249), including what professional learning is required. Within this paradigm, learning is about changing relationships by shaping that situation more effectively in a process that resonates with Engeström’s (2001) conception of expansive learning. Furthermore, Hager’s understanding of learning recognises that knowledge and ability are not just cerebral but can be held bodily, as would be the case for some vocational teachers involved in craft activities.

Winch’s (2010) writing on expertise is also helpful in understanding and promoting the professional learning of teachers. He warns against a simplistic notion of ‘learning through doing’ that undervalues the importance and complexity of professional expertise (p. 187). From the perspective of pedagogy, the complexity of the vocational teachers’ professional role demands more than just practice to improve (p. 45). Experiential learning is necessarily restricted to what is experienced and while this may lead to useful personal theory, Winch argues, it is likely to be limited. So, as well as learning that derives from the immediacy of the workplace, we have also discussed the importance of affordances for learning lying outside this context, “including time to stand back, reflect and think differently” (Hodkinson 2009, p. 165).

What does this mean for vocational teachers who are seeking opportunities for professional learning? In this respect, Fuller and Unwin’s expansive/restrictive framework of approaches to workforce development (in Evans et al. 2006, pp. 40–41 and see Table 40.2 above for Hodkinson’s adaptation) may be helpful. We have been critical of this framework because it plays down the broader context within which a workplace exists as well as the inequalities and antagonisms that are inherent in workplace relations. In some respects such work reflects the impact of neoliberalism, an implicit move away from the critique of capitalist relations

towards a concern with the enhancement of work based activities. Paradoxically a similar feature characterises Engeström and Adler et al.'s work.

Whilst for many workers [expansive learning environments] may offer more fulfilling work and greater levels of autonomy, [they] may also contribute to increased self-surveillance whereby we are enjoined to continually re-invent ourselves to fit the demands of the productive system. (Avis 2010, p. 17)

Just as learning is socially situated, so are the affordances for learning. Despite this criticism, however, the features of an expansive workplace that Fuller and Unwin (2004, p. 130) highlight encourage professional development and so can promote practical demands teachers can raise with their employer through unions where possible. For example, teachers can present a case for having time-off, for professional development, for reflection and for attending knowledge-based courses; or to have the opportunity to share knowledge and skills with colleagues from across the organisation. Above all, teachers need to have organisational recognition that they are also learners. Whilst affordances for professional learning will be determined by the broader circumstances described earlier in this chapter, they remain significant for individual teachers in their workplace.

40.8 Towards a Conclusion

In this chapter, we have considered models of professionalism relating these to Fordism and Post-fordism. This discussion illustrates the way in which constructions of professionalism and learning are temporally and situationally specific but so too are our theorisations which in turn have been 'influenced' by neoliberalism. This is the case with Brown and Lauder's work which has shifted from a celebration of the opportunities surrounding Post-fordism to a far bleaker analysis.

In the case of Post-fordism, we have explored the opportunities for learning that have arisen in this context. We found it useful to draw on the work of Beck and Giddens who have discussed uncertainty, risk and individualisation. These processes have been reflected in the lived experiences of vocational teachers in the expansion and fragmentation of their role, which in turn is allied to proletarianisation and reprofessionalisation. Yet at the same time there are possibilities for the emergence or further development of collaborative communities and at this juncture the analyses of Adler, Engeström and Hodkinson become useful. These analyses are prefigured in some of the empirical work on vocational teachers that address the development of dialogic forms of professionalism. Here we drew on the work of Avis, Gleeson and Stronach, which enabled us to consider the affordances for learning facing vocational teachers in England. This is a very particular context in which vocational education has been devalued and is qualitatively different to that encountered in continental Europe.

The potential for learning is ever present in the labour of teachers. The conditions surrounding pedagogic and workplace practices may be more or less expansive, with consequences for learning. In other words teachers may encounter restrictive or

expansive environments which may hamper or enable learning. Relatedly, vocational teaching is frequently characterised by complexity which is acknowledged in models of ecological professionalism. Such models can place the teacher within networked relations that are often marked by uncertainty, flux and contingency (Abbott 2005; Barnett 2011; Hodgson and Spours 2009). Importantly, neither theory nor the rules and regulations surrounding vocational and pedagogic practice will straightforwardly be able to determine the correct action. Consequently, judgements will have to be made and on occasion reasons and justifications given for the action taken. Such a stance can move beyond the traditional authority that is accorded to professionals and points in the direction of democratic and communal accountability in which there is a dialogue between professionals and a wider constituency (see Avis 2011; Gleeson et al. 2005; Ranson 2008; Rustin 2004). There is however a danger that such a stance could easily be transmogrified into a version of conservative modernisation that lodges democratic and communal relations within an instrumentalist and marketised logic, thereby undermining democratic potentialities. The point is to lodge this move towards communal and democratic practices within a ‘really’ expansive understanding of vocational education and pedagogy akin to that proposed by Clarke and Winch (Clarke and Winch 2007; Winch 2010). They suggest that whilst in England vocational education is considered a narrow preparation for working life, in other societies the academic and vocational are brought together, with the latter embracing civic education and being as much about personal development as addressing the needs of employers. Kemmis reminds us that:

Professional practice and changing professional practice are not matters for individual practitioners, or indeed whole professions alone. They are frequently matters of political and legal debate. (2009, p. 37)

In other words, issues surrounding values, social justice and political ideology as well as the conception of the ‘good’ society cannot be divorced from professional practice and the affordances this offers for learning. These are inevitably questions that traverse professionalism and political debate.

The approaches we have considered in this chapter can only take us so far. In order to fulfil their potential these approaches need to be aligned to a radical transformative politics. This means a critical analysis of work and the labour process needs to be at the centre of any analysis, for without such a stance the approaches we have considered can easily be appropriated by forms of conservative modernisation which in turn carry with them truncated and instrumentalised models of professional learning.

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Chapter 41

Older Professionals, Learning and Practice

Tarja Irene Tikkanen and Stephen Billett

Abstract Globally, workforce is aging. Workers aged over 50 years are becoming an increasingly significant and large component of national workforces, including the professions. This situation is likely to remain the case for the next few decades. Despite workplaces becoming increasingly reliant on older workers, the distribution of opportunities for support, professional development and advancement belies that fact. However, the situation confronting older professionals appears more nuanced and dual. On one hand, many professionals report little or no age discrimination and high levels of opportunities for advancement, should they wish it. On the other hand, they are most likely to retire early and make their own decisions about the duration and intensity of working lives and how they engaged in continuing education programs. They also largely report being active lifelong learners, whose work life learning is shaped by work requirements and challenges. Consequently, considerations for ongoing learning for older professional workers are premised on combinations of opportunities, motivation and capability/capacity (self-efficacy, personal agency), in ways that are quite distinct from other categories of older workers. The chapter proposes that the ongoing development and employability of older professionals is likely to be central to national economies in decades to come. It is necessary to have an adequate fit between provisions of various forms of learning opportunities in and outside workplaces, to support individual skills currency and national innovation capacity. Distinctive for older professionals is a high level of personal choices available for their work and learning, necessitating a concerted

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public and private effort, in broad cooperation among relevant partners, when seeking solutions for extended job-careers in line with prolonged life-spans.

Keywords Professionals • Older professionals • Ageing professionals • Learning • Lifelong learning • Science and engineers • Teachers • Health care workers • Employability • Professional development

41.1 Older Professionals and Lifelong Learning

This chapter discusses older professionals' lifelong learning and career development. Older workers, and along with them workplaces and the society in general, are faced with an array of new challenges and opportunities. The key is to maintain these workers' occupational currency. While older professionals are required to continue to learn and change their practices, they often have a good deal of discretion in how they exercise their work and learning. Hence, their professional learning is shaped more by their interests, priorities and needs than being directed by others, as is the case for many other groups of workers. They have also better access to flexible working conditions allowing them to work into older age than other groups of workers (Harvey and Thurwald 2009). Indeed, while much of the existing research and policy has considered older workers as a rather homogenous group, the circumstances of well-educated professionals are often quite different than those of their less educated and skilled counterparts. In this regards the chapter provides a more nuanced picture on one large section of the ageing workforce.

To provide as accurate overview as possible with the available research, we have narrowed down our approach in several regards. Our focus has been on older professional workers and their needs, opportunities and support for and capacities to their ongoing learning. Much of the discussion covers professional work in general, but we have put some more emphasis on three sectors: engineering and sciences, teaching, and health care. Furthermore, the perspectives of individuals and society are predominant, with less focus on the organizational, workplace context. As there is no globally comparative data available on the situation of older workers, the geographic coverage in the presentation is not systematic. Instead, we have presented examples from selected parts of the world, drawing on international databases from the Organization of Economic Co-operation and Development (OECD), International Labor Organization (ILO) and the European Union (EU), and focused on the situation in Europe, the US, Australia and a part of Asia." Older workers" refer here to those who are aged 50 years. These are people who potentially have about one third, if not more, of their working lives ahead of them. We follow the commonly used definitions of "older workers" by for example the OECD (2006) and the EU (EC 2006). Yet, the ageing process and its consequences are highly individual and culture-sensitive, as showed for example by findings from the Eurobarometer Active Ageing (European Commission 2012). As an informant in one study suggested, what constitutes an older worker is relational to what they do; that a concreter is old by 40, whereas an office-bound worker would be classified 'older' much later in their working life, yet a

university professor is engaging in work which is not as age-dependent (Billett et al. 2011a, b). Furthermore, there is a movement to more subjective definitions of age across the lifespan (Rocco et al. 2003). Finally, the age-based definitions are history-sensitive: a “70-year-old today thinks about work the same way as a 50-year-old would have several generations ago” (Kadlec 2012), as a recent study by AARP (formerly the American Association of Retired Persons) found out (Brown 2012).

Two lines of discussions form the backdrop to this chapter: changing demographics and conceptions of lifelong learning. The current demographic situation presented by an aging population, and, in particular, the one anticipated across the next about 40 years, is historically without precedent. Most countries with advanced industrial economies are facing a need to invest more in occupational competence development (i.e. knowledge, skills, dispositions) and in promoting workplace productivity and innovation (Billett 2006; European Commission 2011; OECD 2012) to sustain their national social and economic goals in an increasingly knowledge-based, competitive and globalised economy. When it comes to ageing workforce, these concerns are accentuated in regard to the availability and quality of human resources. For instance, the fact that nurses and other health care professionals and social workers are ageing, raises concerns about who will take care of the sick and frail in the future (Harvey and Thornwald 2009), there alone be available to assist novices’ learning. A particular point of concern in engineering and sciences is the loss of experience-based competence as the ‘baby boomer’ generation exit from the workforce gains momentum and when labour requirements in this sector are expected to increase (DPA 2013a; NSF 2012). When it comes to teachers, many countries expect to face a substantial shortfall in both the quantum of teachers and their quality in the coming decades (European Commission 2011; OECD 2012). In many ways, these older workers are exposed to quite different forms of age-related barriers and opportunities in working life and need to be considered and accommodated in ways which might be quite distinct from their counterparts in less skilled and prestigious forms of work.

However, not all employees are either provided with or take advantage of the options for supporting their continuing learning relevant to their career development into middle-age and beyond. Often, there are valid reasons why these workers per se do not take up these opportunities. For example, they may doubt their purpose, worth and relevance to their ongoing employability (Billett et al. 2011a). Statistics also persistently confirm the accumulation hypothesis in educational participation (Tuijnman 1991), suggesting that participation in educational activities in adulthood is positively related to individuals’ educational background. This proposition emphasizes the relative advantage of older professional workers. These workers are more likely to participate in ongoing education provisions than workers with lower level qualifications and are more active consumers on the educational markets across their lengthening working lives. Additionally, consistent with theory of reasoned action (Fishbein and Ajzen 1975), their positive attitudes towards lifelong learning and education, and continuous engagement in updating their professional knowledge may counteract the commonly found negative age-participation effect (Tikkanen 1998), often accentuated with age-skewed distribution of the take up of education opportunities.

The chapter is divided into five main sections. After an introduction to the demographic trends concerning older professionals, we will highlight some conceptual perspectives for considering learning throughout the lifespan. In Sect. 41.3, lifelong learning and human resources development (HRD) in the latter half of the lifespan, are discussed in terms of how they are securing older professionals' employability. The fourth section offers an overview of the broad themes found in research on participation in learning and career development of professional workers into, and beyond, midlife and for lengthening working lives. This part presents some accounts of older professionals' learning practices. The presentation draws from organizational and national initiatives and policies in the area, and from cross-national studies on learning participation. Section 41.5 discusses some implications for older professionals' learning and employability, based on recent research in this area. In the final section, a critical perspective of the implications, prospects and emerging issues in the practice, policy and research in the learning and working among older professionals, is presented.

41.2 Demography of Older Working Professionals

41.2.1 A General Overview of the Demographic Change

Current demographic changes and, principally, the aging populations of most countries with advanced industrial economies are creating enormous challenges to nations' economic performance and competitiveness (EuroFound 2008). These changes are occurring in countries across the world, albeit with different levels of current and projected ageing and rates with which it will occur. Table 41.1 provides data from selected countries comparing the current median age (2010) with that projected for 2050.

It shows the degree of difference in these across this 40 year period. It is projected that by 2050 in countries such as Japan, South Korea and Singapore the most typical workers will be those aged 50 and over (Table 41.1). Countries like China and the USA with very large populations are projected to be experiencing significant growth in the share of their older citizens. Also evident in Table 41.1 is that some countries with emerging industrial economies with very large populations have relatively young median ages (e.g. India, Vietnam and Indonesia).

41.2.2 Consequences from Ageing of the Workforce: Focus on the High-Skilled

The demographic change in many Western countries with advanced industrial economies is a product of three developments: ageing of the so-called "baby-boomers" (born soon after the Second World War), declining birth rates of younger

Table 41.1 Projected Median Aged, Selected Countries, 2010 and 2050 (Australian Bureau of Statistics 2008)

Country	Median age 2010	Median age 2050	Difference
Japan	44.6	54.9	+10.3
South Korea	38.0	54.9	+16.9
Singapore	40.6	53.7	+12.9
Canada	40.0	45.3	+5.3
Australia	38.2	45.2	+7.0
China	34.9	45.0	+10.1
New Zealand	36.8	44.1	+7.3
UK	40.0	43.4	+3.4
Vietnam	26.9	41.6	+14.7
Indonesia	28.2	41.1	+12.9
USA	36.5	41.1	+4.6
India	25.0	38.6	+13.6
Papua New Guinea	20.3	30.9	+10.6

generations, and increased longevity. The current demographic situation and, in particular, the one anticipated across the next about 40 years, is unprecedented in human history. Hence, it needs to be addressed by effective, innovative practices and policies, including how to engage older workers productively and sustain their employability. While commonly considered as a problem and/or challenge, it is important to understand that this new situation provides also new opportunities at national, organizational and individual levels (Organization of Economic Co-operation and Development 2006) for effectively engaging such workers and assisting them to have worthwhile and productive working lives. In the following, we will briefly discuss consequences from ageing of the workforce in regards three major issues: labor force availability (i.e. manpower), human capital and productivity (i.e. skills availability), and career development and employability across lengthening working lives.

41.2.2.1 Workforce Availability

From the global pattern of demographic change drastic changes will follow in the availability of workers per se in the coming decades, with major consequences to national economies' ability to meet their social (i.e. in the areas of welfare, education and health) and economic goals. Some countries have quite old workforce already (e.g. Sweden) and older employees' exit to retirement pose vast challenges in workplaces and for policy makers. According to the estimations by McKinsey (2012) by the year 2020 there will be a potential shortage of about 16–18 million high-skill workers in advanced economies (high in GDP per capita and high educational attainment) and of another 23 million college-educated workers in China alone. By 2030, the European Union (EU) is forecast to face a labour shortage of some 20.8 million people (6.8 %) of working age (EuroFound 2008). The shortage

of young people to replace those who retire is held to be one of the three megatrends influencing the future economies (Henning and Borowski 2009). In 2007, young people aged under 30 years represented about 35 % of the total population in the European Union 27 (EU27). This rate has since steadily declined. Conversely, the number of people aged 60 years has more than tripled since 1950, and is expected to almost triple again by 2050 (United Nations 2010). In Europe, the demographic ageing has been accelerating with the number of people over 60 years currently increasing twice the rate of that before 2007 (European Commission 2010).

As a consequence, many countries are facing a situation where securing adequate labour force for economic prosperity in the future requires either increasing the immigration of (young) skilled labour (Zaidi 2008) or extending the job careers of senior workers – or both. Examples of both kinds of development are already taking place in many European countries and beyond. For example, in Norway and the UK the national statistics show that there has been a dramatic increase in foreign labor during the last decade, as a result of a purposeful foreign recruitment, especially of the high-skilled professionals. Thus, what adds to the challenges of workforce availability in some countries is the downside of the mobility of the high-skilled labor: the inevitable brain-drain to the countries from which the mobility is occurring. For example, in the USA, 17 % of all the workers in science, technology, engineering and math (STEM) occupations were foreign-born in 2008 (McKinsey 2012), though the number fell sharply in 2009 (NSF 2012). There are signs that the efforts to attract and retain high-skilled labor, especially in the areas of skills-in-demand, have started to change companies' human resources policies (Restrepo and Shuford 2012; Shapiro et al. 2011).

A further challenge is posed by a section of older workers, who choose to – or in some cases are forced to – exit the labor force earlier than their legitimate pension entitlement age. As a consequence of this trend, which started in the 1980s, the actual age of exit is in many countries a good deal lower than what the official age for pension eligibility (Medeiros and Minty 2012). For example, in 2012 the employment rate for workers aged 55–64 years in Europe was only 47.4 %, while the Europe 2020 strategic target (European Commission 2010) is set to 55 % (Medeiros and Minty 2012). Figure 41.1 shows labor force participation rates in selected countries in the year 2012 for workers aged 55–64 –years based on ILO statistics. The differences between countries are large, varying from as low as 33–36 % in Turkey, Slovenia and Malta to the vast majority (over 70 %) still being active in Iceland, Sweden, Switzerland and Norway. Figure 41.1 also shows that the participation rates among men are higher than those among women in all but one country (Finland) and are highlighted where it is high, 70 % or above. The latter suggests that older female workers may be particularly vulnerable in the ageing labor markets. A widely used remedy in many industrialized countries is to provide impediments to early exit from the workforce. For example, many countries are increasing the age that constitutes pension -eligibility to encourage longer participation.

Different needs of and motivations for older professionals to continue to work, play out differently to particular patterns of workforce availability. Generally, the

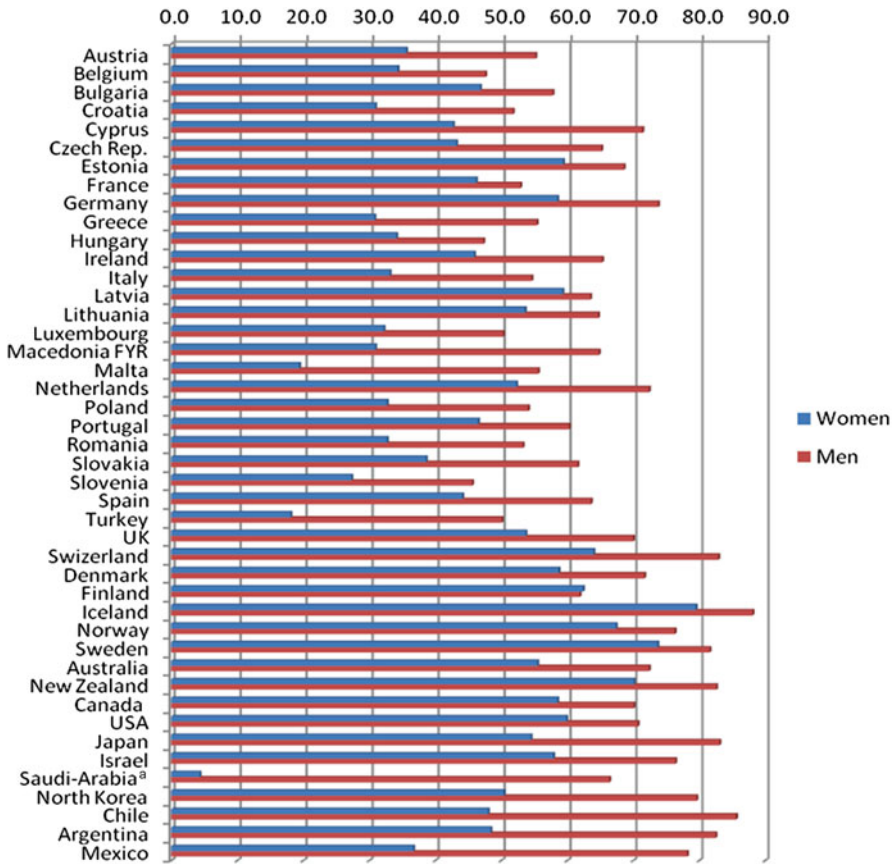


Fig. 41.1 Labor force participation rates among workers aged 55–64 years by gender in selected countries (where data available) in 2012 (4th qrt) (%) (Source: LABORSTA online database, ILO (2013). ^aData from the 1st qrt in 2012)

labor force participation rates are strongly related to educational background across different cultures and countries. As shown in Table 41.2, this relationship is also found among older workers 55–64 years: the participation rates among the high-educated in this age group are much higher across countries than those among the total – on average much younger – working population (15–64 years) with only basic education. The differences between countries in the group of high-educated are also much smaller (37 % units at its largest: between 88.7 % in Iceland and 54.6 % in Slovenia) than those in the group with only basic education (50 % units at its largest: between 69.4 % in Iceland and 19.4 % in Lithuania). The participation rates of the high-educated older workers are also clearly higher than the average rates among all workers in this age group (a comparison of the rates in Fig. 41.1 and Table 41.2 where statistics available, details not shown here). Interestingly, the latter differences in favor of older professionals are especially large (20 percentage units

Table 41.2 Labour force participation rates by education and age in 2012 in selected countries

Country	Level of education			
	Population 15–64 years			55–64 years ^a
	Basic	Intermediate	Advanced	Advanced ^b
Austria	44.2	72.2	81.1	67.3
Belgium	35.8	66.1	79.2	56.9
Bulgaria	30.6	64.8	78.3	62.7
Croatia	25.5	57.2	74.6	59.2
Cyprus	41.3	72.2	85.6	63.5
Czech Rep.	25.1	68.1	79.1	75.5
Estonia	36.8	70.1	80.6	73.1
France	43.9	67.5	80.7	60.8
Germany	46.2	69.9	79.7	75.4
Greece	43.6	64.2	82.4	50.9
Hungary	27.6	64.9	75.9	57.3
Ireland	38.8	68.3	81.8	61.5
Italy	41.2	67.3	77.8	69.9
Latvia	35.6	68.2	85.6	72.7
Lithuania	19.4	66.6	86.6	71.9
Luxembourg	43.4	61.6	81.3	64.7
Macedonia FYR	37.0	69.7	79.6	59.8
Malta	44.1	68.6	82.5	61.2
Netherlands	54.4	75.6	83.8	73.1
Poland	24.6	64.0	83.1	62.0
Portugal	59.7	74.1	85.6	61.8
Romania	41.5	64.4	82.1	57.5
Slovakia	22.6	70.1	75.5	65.4
Slovenia	37.0	65.9	80.9	54.6
Spain	54.8	71.2	84.5	64.7
Turkey	45.4	57.0	80.4	40.2
UK	56.6	74.9	84.1	64.9
Switzerland	60.7	74.8	86.4	81.5
Denmark	51.3	72.6	83.1	73.5
Finland	36.4	70.5	79.2	70.4
Iceland	69.4	79.2	90.5	88.7
Norway	54.0	72.4	84.5	84.4
Sweden	45.3	77.2	82.6	83.1

Sources: LABORSTA online database, ILO (2013)

^aLabor Force Survey, EUROSTAT (2013)^bCovers ISCED97 levels 5 and 6

or more) in countries where older workers' labor market activity is low (Austria, Czech Republic, Italy, Luxembourg, Malta, and Poland, as shown in Fig. 41.1. This suggests that, in general, highly-educated older workers can and do choose to work into higher ages than their less educated counterparts, even if they are likely to be better able to afford to leave their jobs early.

However, there are also sub-sections of older professionals who have other priorities than to continue working to a high age. Evidence from Singapore (Billett 2011) indicates that older professionals often have a greater interest in and ability to exit the labour force, because of superior accumulated wealth and other resources. Contrary to the general statistics as shown above, these workers reported being far more likely to leave the workforce than those in lower-level occupations, and put priorities such as family commitments above the need for continuing employment. These hard-to-replace workers, are able to exercise discretion in the length of their working life and more so than other kinds of workers. Thus, elevating the pension entitlement may not be an effective policy measure for the former. Instead, as these workers reported, issues associated with quality of working life and balance between work and family lives, may need to be addressed.

However, making more complex such trends, the recent economic recession has shown that many ageing workers are electing to work longer for personal economic reasons. For example, in the USA, the employment rates of older workers aged 55 years and above increased with 4 % during the recession, while it decreased in all other age groups (Engemann and Wall 2010). While these rates indeed started to increase already well before the financial crisis (Sok 2010), there are still many older people in need to work after the large losses in their pension accounts or to ensure a sufficient self-funded retirement income and not being able to rely upon the government provided provisions of welfare (for example, a half of the US workforce does not have an employer provided pension (DPA 2013b)). A recent study (Brown 2012) showed that financial reasons – need for money or a health insurance – were primary reasons that 78 % of workers aged 50+ years in America are working or looking for work. Yet, improved financial circumstances and improved pension provisions (e.g. Singapore) may well see these trends reversed.

41.2.2.2 Human Capital and Productivity

Highly-educated older professionals will play important roles in the future economies. While the office of tomorrow will look different – more older employees – the need for high-skilled workforce will be increasing. According to the OECD (2012), skills have become “the global currency of the 21st century” and to retain their value, they must be continuously developed, throughout working life. The requirements for effective work, including that in professions whose training time and accumulation of salient experiences takes long to replace, are constantly changing as new technologies, procedures, priorities and needs arise. There is a need for developmental opportunities for older workers to increase their labour force participation and to retain them longer in employment, to narrow the potential future skills gaps (McKinsey 2012). Furthermore, it will be crucial both to develop the right, in-demand kind of skills through encouraging that kind of learning and to put the existing skills in better use through more effective skills management and management of increasingly diverse workforce (EIPA 2012; OECD 2012).

As the share of younger employees in workforces is diminishing, productivity will increasingly rely upon the contribution of the labour force aged over 50 (Turbé-Suetens and Kouloumdijan 2008). As productivity and economic growth, particularly with technical, professional, and paraprofessional work, is strongly associated with levels of educational attainment (i.e. human capital), lower productivity is easily seen as being coupled to older workers who generally have lower levels of educational qualifications (European Commission 2008). However, the relationship between productivity and age has long been disputed (Skirbekk 2003; Tikkanen 2011). Some studies suggest that lower productivity is typically related to higher age of workers, following an inverse u-shape over the life-course (Henseke and Tivig 2007), particularly in non-managerial positions, peaking between the ages of 30 and 50 years (Malmberg et al. 2005). Clearly, the nature of the age-productivity relationship is related, not only to how productivity is defined and measured, but also to the nature of the jobs and job tasks under review. A study by Malmberg et al. (2005), based on data from industry in Sweden, showed that ageing is not a problem to productivity, due to a strong learning-by-doing effect, and concluded that “productivity of the young is overestimated and the productivity of the old is underestimated” (Malmberg et al. 2005, p. 2). Indeed, for older workers, especially those with continuously changing and developing work, learning during their long careers has not been an alternative, but constitutes a necessity. Not surprisingly – and unlike other categories of older workers – the older professionals are often considered as valuable assets for their workplaces, due to the accumulation of their expertise by experience over time (Tikkanen 2011). For instance, many of these older professionals are able to choose a second career as private consultants after exiting their jobs. These workers are also increasingly hunted for management and mentoring positions by companies looking for robust experience, on the labor markets where demands for high-skilled labor are growing faster than supply (McKinsey 2012).

41.2.2.3 Career Development and Employability

Career development among older employees, even among the highly-educated, is a relatively new thing. On one hand, the novelty is in the focus on careers and possible career changes among mature age workers, on the other hand, for some workers this need is emerging from necessity (Claes and Heymans 2008). The nature of work and employment contracts has been changing and so have career patterns (European Commission 2004; Hall and Mirvis 1995; Maurer 2001).

The change has been dramatic across the working lives of the generation currently representing older employees (i.e. those beyond their 50s). The traditional model of education-work-retirement has become dispersed. Increasingly, transition into retirement has become a prolonged process, taking place either gradually or marked by periods out of work and returning back to work (Tikkanen 2009). Especially for high-educated professionals, work means no longer necessary one job and/or workplace lasting until retirement. There are signs that, for these

employees, workplaces are becoming a dynamic space rather than ‘a unidirectional journey leading to retirement’ with multiple exits and entries and increased individual choice (Rocco et al. 2003). The same trend is signaled also by a steady increase of mature students in participation in occupational and higher education (Tikkanen 2009).

The interest of governments and enterprises as well as among individuals is growing in sustaining employability (maintain one’s ability to engage in employment) and career development through lifelong learning. This interest has become a powerful imperative as processes of knowledge creation and work requirements transform, and the role grows for workplace innovations that can sustain the viability of enterprises and their collective ability to secure progress, productivity and competitiveness of national economies (Billett 2006; OECD 2012). Focuses for policy have often been on their work and working conditions, compatibility between the work and the worker, employability and lately especially on career guidance and counseling (European Commission 2008). In professional work, also older employees’ competence and career development are increasingly incorporated in companies’ personnel management policies, as part of recently new perspectives of “age-management” (Ilmarinen 2006; Walker 2005) and/or “talent management”. For instance, in Singapore a re-employment act has been introduced which stipulates that on Singaporeans reaching their 62nd birthday their employer have to negotiate continuing employment, reassignment or can recommend further training and development.

When it comes to governmental concerns for extending careers among ageing workers, although frequently mentioned in policy documents, these have not always been translated into active promotion of occupational development of and for older workers. While still rare, career development as a case of (re)training older professionals, is increasing steadily as statistics from some higher education institutions are showing. A complete (re)training, though, is usually only an issue in case of health problems or when a particular occupation has ceased to be in demand. Nevertheless, structural changes can cause governments to react in ways to support the occupational transition of professional workers. For instance, the recent global financial crisis impacted upon the employment of professional, executive and technical workers in Singapore more than other workers (Billet 2011). Consequently, the government decided to implement plans for the retraining of a large number of workers so affected. However, this example is probably atypical.

41.2.3 Some Cases: Engineers, Teachers, Healthcare Workers

In this section we shall illustrate the rate and consequences of the demographic ageing in more detail among three cases of professions: teachers, nurses and engineers (science, technology, engineering and mathematics, STEM).

41.2.3.1 Engineers

If science and engineering are only supposed to be appropriate for young people, the ageing society will pose a huge concern for innovation and creativity (Henseke and Tivig 2007). In case of engineers, a particular concern is the loss of experience-based competence as the so-called 'baby boomer' generation retires and at a time when demand for this kind of work force is particularly strong (European Commission 2011) and is expected to increase. Technological development poses a continuous challenge for learning at work for professionals and engineering is no exception. This challenge knows no age-limits and not even the engineers themselves are immune to this change. Indeed, the US National Academy of Engineering (2005) has called for educational systems to produce not only engineers who are job-ready on graduation with their core occupational knowledge but also as lifelong learners. Advantages of older professionals when compared to workers with lower levels of education, can be their better learning skills, more positive self-image as learners, and more constructive attitudes towards the task of ongoing learning. However, the information technology sector may be particularly hostile towards older workers for reasons associated with the sector's youth-oriented culture, on-the-job time pressures, and rapid skills obsolescence (National Science Foundation NSF 2002).

Age distribution and retirement patterns of the science and engineering workforce affect its size and productivity, as well as the opportunities available for new workers (NSF 2002). The baby boomers generation, while representing a large share of the human resources in science and technology (HRST), are approaching their retirement age. In Europe 41 % of the HRST in 2010 were aged between 45 and 65 years, much higher than the share for young workers aged 25–34, 30 % (Eurostat 2011). Also, in these rates there are large differences between countries, as shown in Fig. 41.2. With some exceptions (such as Luxembourg and Belgium) the countries with oldest populations have also largest shares of ageing HRST of their active population.

The trend is similar in other parts of the world. According to the US National Science Foundation (NSF 2012) the median age of the scientists and engineers rose from 37 to 41 between 1993 and 2008, and the proportion of those aged over 50 years increased from 18 to 27 %. During the same period, the employment among older engineers aged 60–64 years rose significantly, from 59 to 66 % (NSF 2012).

STEM is a large employment sector, accounting for 25.4 % of the US workforce in 2012 (DPA 2013b) and almost one third of the employed population in the EU in 2010 (EUROSTAT 2011). While being central for the production of goods and services, it is rapidly growing and at the same time facing a significant shortage of qualified workers (DPA 2013b). The situation is strongly related to the soon-to-retire baby-boomers' generation. Moreover, within some occupations a particular social sentiment, which views this work is being unattractive (i.e. dirty work), may make it look as less attractive to young entrants than other occupations. This particular issue played out strongly in South Korea which has a strong dependence upon manufacturing yet struggled to secure enough workers within the manufacturing sector. Efforts to recruit workers were countered by parents' wishes, the preference of teachers and societal sentiments, all viewing this work

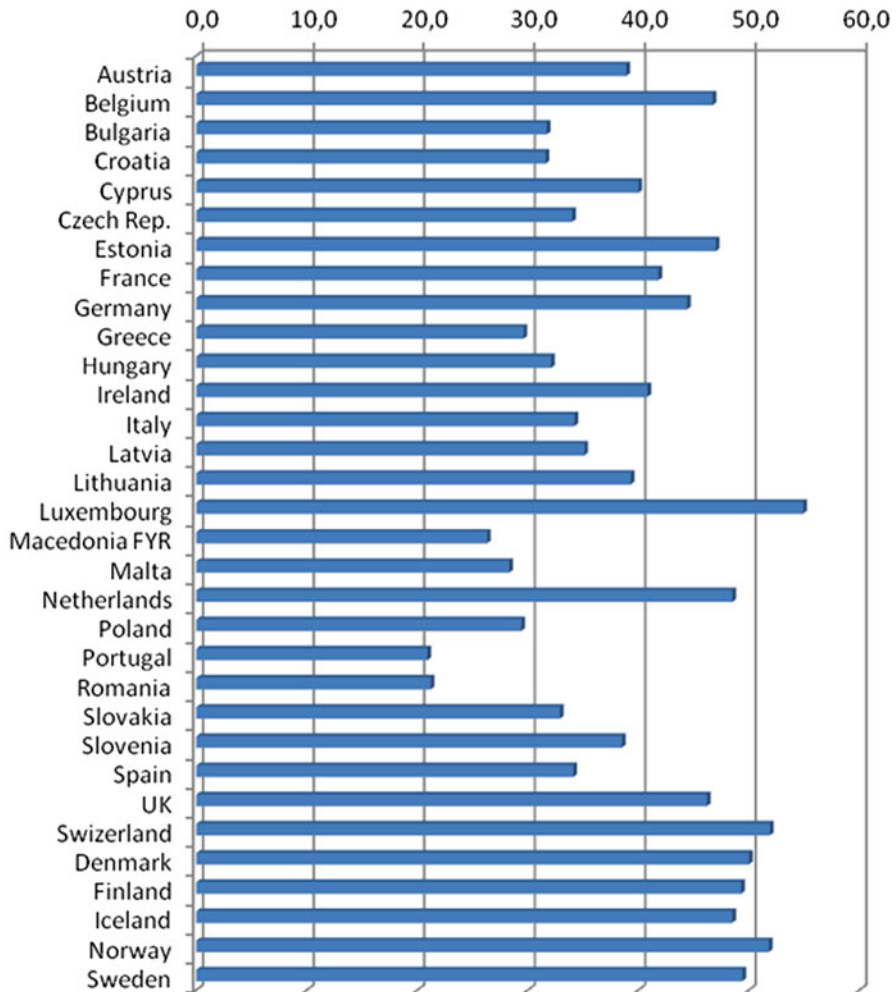


Fig. 41.2 Human resources aged 45–64 years in science and technology in Europe in 2011 (shown as % of active population) (Source: Eurostat 2013)

as being low status (Cho and Apple 1998). In this situation young people are in a position to pick and choose their preferred occupations. Those occupations not seen to be socially desirable may have great difficulty in recruiting young people. Hence, engineering, like other occupations with an aged profile, may need to find ways of attracting younger employees.

41.2.3.2 Teachers

Sustaining a highly educated population is central to being effective in highly competitive economic markets. Yet, many countries also expect to experience shortages in terms of availability and competence levels of their teaching workforces in the

Table 41.3 Older teachers in public and private institutions by level of education and age group in 2011 (%)

Country	Lower secondary education		Upper secondary education	
	50–59 years	60 years and above	50–59 years	60 years and above
Austria	43.3	2.9	35.4	4.4
Belgium	28.5	3.4	29.7	3.8
Canada	n.a.	n.a.	22.1	4.2
Chile	23.6	9.7	22.5	8.2
Czech Republic	27.3	5.2	34.3	9.3
Denmark	27.1	9.6	n.a.	n.a.
Estonia	29.3	16.8	29.4	18.9
Finland	25.8	4.6	30.5	11.6
France	25.1	3.6	30.2	4.6
Germany	38.3	13.0	34.5	11.7
Hungary	33.5	1.7	26.6	4.4
Iceland	24.3	9.8	32.1	17.3
Ireland	n.a.	n.a.	25.6	5.5
Israel	23.3	4.9	24.4	11.6
Italy	50.4	10.6	53.2	9.3
Japan	26.2	1.3	30.0	3.8
Korea	17.8	0.7	22.4	1.1
Luxembourg	18.2	3.3	26.2	5.9
Netherlands	32.1	10.4	38.6	12.0
New Zealand	27.8	13.0	29.1	14.4
Norway	23.0	11.3	30.2	17.9
Poland	16.4	1.8	21.6	6.1
Portugal	22.4	2.4	19.6	2.4
Slovak Republic	30.7	6.1	31.0	7.6
Slovenia	27.9	2.5	26.6	4.7
Spain	25.6	4.6	26.3	4.5
Sweden	22.0	13.3	26.7	17.5
Switzerland	29.2	6.4	31.3	7.9
United Kingdom	21.9	3.2	23.7	5.6
United States	25.1	6.7	26.7	8.8
OECD average	27.4	6.5	29.0	8.4
EU21 average	28.7	6.3	30.0	7.9
Brazil	14.6	3.1	15.5	3.8
Indonesia	7.7	1.0	10.2	1.4

Source: OECD Education at a glance 2013

coming decades. Retaining older teachers may be a key consideration for sustaining viable education systems. According to OECD (2010), most countries already have a shortage of well-trained teachers and a major challenge with providing teachers with sufficient opportunities for the professional development that they need. Table 41.3 shows the share of teachers in public and private institutions in lower and upper secondary education. As the table indicates, the oldest teachers work in upper secondary education.

In the Teaching and Learning International Survey (TALIS, OECD 2009) over a quarter of the teachers were over 50 years. In 2011 in some European countries (Austria, Czech Republic, the Netherlands, Sweden, and Norway) the rate was over 40 % – in Germany and Italy over 50 % (OECD Education at a glance 2012). Again, the differences between the countries are large. There are also countries with much younger teaching workforce. In the TALIS-survey half or more of the teachers in Belgium (Flanders), Brazil, Ireland, Malaysia, Malta, Poland and Turkey were below the age of 40 (OECD 2009).

The US Bureau of Labour Statistics has forecasted that the job prospects for teachers by 2020 will increase by 17 %, among others due to retirement of older teachers. The current and anticipated teacher need/shortage is also due to economic and structural factors. One is that the teacher salaries are moderate and the relative value of teacher salaries in many countries has been decreasing (OECD 2009). Consequently, jobs in better paid forms of employment attract many of those with teacher qualifications, or they simply choose other fields of study initially. OECD (2005) studies show that there are particular and major difficulties in many countries in recruiting teachers in computer sciences, mathematics, technology, foreign languages and sciences. Also, as the demands for teaching and upon teachers increase in terms of student behaviour, reporting, and administration, this kind of employment might become even less attractive to young people.

41.2.3.3 Health Care Professionals

The OECD has forecasted that about 30 % of the public sector employees will exit the workforce during the next about 15 years. The aging of the health care workforce (physicians, nurses, and other health care professionals) raises a range of concerns. One is that many of them will retire about the same time that demand for their services is increasing, due to general population ageing (Dubois et al. 2006; Harvey and Thurnwald 2009; HRSA 2003). Moreover, in comparison to private sector, the public sector has to rely on a much older workforce, who will have to work longer in future (European Institute of Public Administration 2012). This poses new challenges to human resources management, especially from the transformational perspective, i.e. workforce planning and staffing, education and training, performance management, and working conditions (Dubois et al. 2006). Furthermore, typical in this sector is the growing demands of work and high staff turnover, accelerating labor migration, and looming shortage of some type of health care workers, as reported across many countries (Rechel et al. 2006). Moreover, the preparation for professions such as medicine and associated specialism take many years to complete and to replace those who retire, requires long periods of preparation. Also, despite the huge need, only a very limited number of nurses being trained want to specialize in aged care nursing because it is seen as being of low status nursing work (Somerville and Bernoth 2001).

A solution used in this situation by some countries (e.g. Norway) is to attract immigration of high-skilled health care professionals (Dubois et al. 2006). Another approach is increasing flexibility in work, so that the job tasks and schedules better

match to the employees' abilities and situation, rather than requiring the employees to match the job tasks (Ilmarinen 2006). On the side of these, the rapid knowledge advancement in the health care sector, due to continuous development of materials, technology and knowledge in medicine, necessitate strong, on-going support to the everyday learning and competence development occurring in workplaces. Clearly, this poses new opportunities but also challenges to the employees, management and health care organizations amidst the ageing population.

41.2.4 Summary

Populations in most countries with advanced industrial economies are ageing. This has direct consequences for the numbers of workers available, the provision and demand of services, the kinds of services they have to provide, and the difficulties associated with replacing workers who withdraw from the labor market through retirement or who move to a more preferred occupation. These trends are being countered by a range of governmental measures and social circumstances. Governments are increasingly seeking ways to encourage ongoing participation by workers up to and beyond traditional retirement age. Moreover, social circumstances, such as the need for self-funded retirement and lack of availability of social welfare provisions, mean that many individuals are making strategic decisions about continuing with paid employment. Yet, the focus of this chapter – older professionals – maybe one group which is least affected by external mandates and may well be better positioned than other cohorts to make independent decisions about the point at which they leave the workforce. Indeed, as the pool of labor is shrinking and demand for high skills is increasing, the competence of older professionals may make them increasingly attractive in the future labor markets. Nevertheless, issues of retaining older professional workers and maintaining their workplace competence, has associations with their lifelong learning and the ways their workplaces have been both learning-conducive and –supportive.

41.3 Lifelong Learning

41.3.1 The Issue of Lifelong Education and Challenges in Implementing It

41.3.1.1 The Concept of Lifelong Learning

Discussions about lifelong learning (LLL) are often confused and sometimes fail to make a distinction between what people do across their lives (i.e. learn across their lives) and the provision of intentional experiences to try and secure

particular kinds of learning (i.e. lifelong education). While there are different ways to understand the concept, two main conceptions can be distinguished. On one hand, LLL can be understood as individual activity, something that people do, and most of them everyday across and their lives in different contexts. On the other hand, LLL refers to the policy, which aims at securing the conditions and opportunities for learning of the individuals. From the first perspective LLL can be understood as a broad meta-concept, comprising of all “*all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competence, within a personal, civic, social and/or employment-related perspective*” (European Commission’s Communication in 2001 on lifelong learning). As such, this conception covers all forms of learning, originally defined by Coombs and Ahmed (1974) as formal (such as degree courses followed in training institutions), non-formal (such as vocational skills acquired at the workplace, as organized and systematic learning) and informal (such as inter-generational learning at work or home, self-study, experiential learning, and incidental learning) (Colardyn and Bjørnavold 2004; LaBelle 1982). As guiding principle for policy, LLL refers to the implementation of the vision of “provision and participation across the full continuum of learning contexts” (EC 2000, p. 3).

Indeed, humans have no choice to learn, because as we have experiences, we think and act we also learn. Yet, quite separate from the everyday (informal) learning, which all of us engage in, are also intentional efforts associated with securing particular kinds of learning (e.g. professional development activities, training programs). The latter covers formal and non-formal learning, usually referred to as education (in non-English speaking countries also as *training*) and is commonly organised by others to influence the learning of particular kinds and of particular individuals. These two terms often become conflated and confused. For instance, in major government reports from the United Kingdom and other places, the term lifelong learning is used in the title and throughout in reference to provisions of continuing education and training (Billett 2010a). This distinction is more than semantics. The arrangements that governments, employers, church, professional groups make in providing continuing education provisions for older workers, such as professions, can only be their intentions and efforts to influence people’s learning. As education never is a simple process of imparting of knowledge, there can be no guarantee that what is taught, instructed or discussed in the training program will be learnt, there alone in the ways as intended by the designers and teachers of that program. In practical terms, this distinction is also a very important because the vast majority of learning across working lives occurs through everyday experiences outside of training or educational programs or even the guidance of more expert or experienced co-workers. Instead, that learning and its direction is shaped by workers as they engage in their everyday work activities, addressing new problems and challenges as they arise and resolving problems and served by extending what they know (Billett 2010a).

41.3.1.2 Challenges in Implementing Lifelong Learning Among Older Professionals

When discussing lifelong learning in terms of the ongoing development of older professionals it is important to be clear about whether we are referring to learning or educational processes – or both. This clarity is particularly important because there are often quite different imperatives being enacted in these processes. For individuals, that learning can be about sustaining their employability and securing advancement, which extends to their sense of self as an individual and as a professional. The degree by which these matters are important to them, are likely to shape how they engage in the everyday act of learning as well as in particular education initiatives, such as professional development or training programs.

For the state, industry sector or employer, educational provisions can be about achieving specific goals such as developing specified knowledge, skills and capacities, meeting new regulatory requirements, workplace health and safety provisions and being able to respond to new initiatives in the workplace. For instance, the focus of governments' efforts associated with lifelong education has been transformed in the last 15 years. In previous times, lifelong education was associated with cultural pursuits and individuals' betterment (in Europe referred to as "liberal adult education" – Jarvis 2010), even extending to attempts to compensate for a less than satisfactory schooling experience (often referred to as "second chance"). However, following the 1996 Year of Lifelong Learning sponsored by the OECD the focus of such educational efforts was transformed. Firstly, lifelong education was to be associated with economic goals such as employability, the advancement of careers and occupational mobility. No longer would governments in a range of countries such as the UK and Australia support liberal adult education, programs that were about broader educational goals and cultural betterment. Instead, lifelong education was to be closely associated with national, workplace and individuals' economic goals. As part of this policy push, it was also suggested that the key economic burden of this ongoing form of education should be borne by individuals themselves.¹ That is, as recipients and benefactors of that education, these adults should also sponsor it. Different approaches and practice can, however, be found in other countries, such as for example in Norway, where employers are regarded as responsible for providing for learning of skills and knowledge that their employees need to keep up with their work.

In sum, implementing of lifelong learning is conditioned by how the term is interpreted and understood among stakeholders. Whilst lifelong learning is a decisive factor for both the individual career development and the profitability and competitiveness of firms (Onsktenk 1992), there is an important distinction between the personal processes of learning and the provision of experiences such as training programs, action learning, learning circles etc. which are directed towards particular

¹An exception here is when LLL is used as a strategy to combat unemployment and marginalization, among others by older workers, as it has been defined by OECD, UNESCO, Nordic Council and G7 countries.

kinds of learning, and usually by others than those who are learning. Importantly, lifelong learning is not something that needs to be made to happen by others (Billett 2010a). However, lifelong education often is required to be made to happen. Yet, the process and outcomes of both are subject to individuals' interests, intentionalities and capacities, not to mention their assent to participate. Ultimately, it is how individuals elect to engage with various learning activities and programs that determines their worth.

Although there is widespread acceptance of and guidelines for educational policies in European countries associated with promoting lifelong learning, when associated with particular economic purposes the enactment of these policies still poses major challenges. Adoption of the concept of LLL and implementing it vary greatly between countries and continents, along with their policies and practices in regards ageing of the workforce in general. Whilst in some countries (e.g. in Finland, Denmark) the nation's overall educational policy has been fully transformed into lifelong learning policy, not all countries possess education and training institutions and provisions able to support lifelong learning or education. Sometimes efforts to achieve this are intermingled with existing programs for students from younger age groups who might be entering the workforce or a particular occupation and who have quite different needs, levels of readiness, and ways of engaging than mature age adults. One mistake is to treat older workers and professionals like younger learners, which deny their contributions and sense of self as learners. On the other hand, it can be a real challenge for those institutions to accurately identify and respond expeditiously to the particular shortcomings and/or obsolescence in the skills and knowledge of particular cohorts or even individuals in the labour market.

The extent and needs of an ageing labour force potentially challenges the mindsets, practices and policies of education and training institutions for initial occupational preparation. Given the need for much of these educational efforts to take effect outside of educational programs, it also raises major questions on, how to know what kind of competence and skills are needed, beyond information and communication technology (ICT), and how to define skills quality ("high skill") other than through educational assessment and certification. Important work in this area has been carried out for example by the European Centre for the Development of Vocational Training (Cedefop), based on the 2007 Council Resolution 'New skills for new jobs'. The latter stressed the need to anticipate the skill needs – and skill gaps – emerging in the European labour market, and was followed by the 2008 Spring European Council, which called for a comprehensive assessment of skill requirements in Europe up to the year 2020 (Cedefop 2008).

41.3.1.3 More Comprehensive Lifelong Learning Policies Emerging

More recent policy developments and approaches to ageing in working life in Europe show signs of a more holistic approach to the concern for older workers (Ilmarinen 2006). The key message of the report by Ilmarinen (2006) is the

promotion of active ageing in working life and beyond, which supports the more general goal of active citizenship. Measures are now sought to extend older workers' contribution to working life in line with increased life-expectancy. Lifelong learning is seen as a crucial response. The more comprehensive approach seeks to integrate the three perspectives of having the ability (i.e. health, competence), the opportunity and being willing (i.e. motivated) to work longer and remain an active learner throughout one's lifespan. Besides pension reforms, in the new millennium attention has turned to workplaces and to initiatives and measures there to provide real options and conditions for extended careers. For the EU-25, active ageing and reaching the goals for 2020 as defined in the Lisbon strategy, still pose a significant challenge. As noted by Ilmarinen (2006), for 'approximately half of the new Member States and about 80 % of the new workforce, active ageing is an unknown concept and a very distant goal' (p. 51).

In Northern Europe, a more comprehensive response for the older workers has been developing under a general and long-standing policy focus of workplace well-being (Ilmarinen 2006; Tikkanen 2006). However, there is some variation amongst these countries in what constitutes wellbeing sought for older workers. For example, Finland has been working under the conceptualisation of *work ability* and promoting *age-management*, while Norway has promoted the framework of an *inclusive working life* to secure outcomes that are acceptable to both employers and employees (Kossen and Pedersen 2008) and this be achieved through dialogue. Here, the need for such action has been accentuated by the high sick-leave rates among and, in some countries and industries, continuing labour shortages. The focus of the discussion has also broadened significantly through the policy and practice of lifelong learning. Indeed, the statistics by the OECD and the European Union (EU) show that Finland, along with the other Nordic countries, has made the greatest progress in implementing lifelong learning. Job-competence, competence development and the learning needs of older workers are increasingly receiving attention within the overall concern for ageing of the workforce. This focus is also being promoted in the EU's lifelong learning action plan 2007–2013. As more generally in Europe, the latter development is taking place alongside the diminishing trend of younger age cohorts and their different competence, interests and preferences regarding working life compared to older generations. It seems that a more 'organic', bottom-up concern for older workers is emerging in many of these countries.

41.3.2 Older Professionals Push for New Mindsets on Work and Lifelong Learning

The pressing demographic development and due concerns in working life have marked the new millennium with a paradigm shift in ageing policies and practice in workplaces and in society. Working life is changing, the concept of "older worker" is changing, and the concept of "education" is changing (to realizing LLL) (Tikkanen 2012). The "disadvantage model" seems to be losing ground, as a more optimistic,

successful or productive outlook on ageing is emerging (Manheimer 2005). What in itself is pushing forward a new mindset and lifestyle of the new generations of older workers, is the historical cohort effect: they are both more educated and have lived in a more advanced societies than their predecessors. As Harvey and Thurnwald (2009) have suggested, the current ageing generation “has been raised on an ideology of lifelong learning, creativity, flexibility, and opportunity” (p. 383), which, in comparison with previous generations, makes them better equipped “to make informed decisions about its patterns of consumption, investment and leisure activities” (p. 384) – indeed, make them better equipped to self-manage the issues and challenges of their own ageing in a creative manner.

For older workers, the new mindsets and realities of increasing flexibility regarding work, retirement and learning (Nyhan 2006) could mean the gradual disappearance of a complete retirement from work, at least to much higher ages than what is the situation currently. Rocco et al. (2003, p. 155) have conceptualized the emerging ‘workspace as a field of interacting forces where older workers’ decisions to remain, return, retire, or renew the work contract is moderated by organizational decisions to retain, retrain, recruit or redesign the work contract for older workers’. To resourceful older workers, such as those in the professions, this conception of lifelong learning has the potential to add to their life-choices and empowerment, allowing them to make informed choices within a range of career and work related options (Olesen 2006). This development is held to be marked by the evolution of a new, more resourceful type of older people, *neo-elderly*, suggesting that an age-irrelevant (Neugarten 1982) or an ageless society (Manheimer 2005) is emerging.

However, these visions of lifelong learning and workplaces as sites of lifelong learning are not without their critics. It has been pointed out, that under these kind of conditions, distribution of lifelong learning opportunities could increasingly become a function of marketplaces that can only be utilized effectively by those older workers who are well positioned in the market place (e.g. professionals), in sufficiently good health and who are motivated by their prior positive experiences in and from their prior education (Manheimer 2005). Yet, differences in material and social conditions cause inequality in learning opportunities for particular cohorts of older learners (Findsen 2006). Indeed, there are some internal contradictions and tensions in the discussion of lifelong learning (Edwards et al. 1995), perhaps particularly pronounced in the case of lowly-educated older workers and other marginal groups. So, although the concept of lifelong learning as a basic human activity and way of facilitating human development is generally accepted and agreed upon, it is recognized that its potentials and capacities differ markedly across populations of workers. Lifelong learning has potential to opening up and promoting new learning freedom, visions, options and outcomes for individual choices in working life and beyond. However, at the same time it has created new and powerful inequalities with strong issues around access to knowledge and individualization. In considering older professionals and their ongoing learning for work-related purposes, we have focused upon a set of workers who are more likely than other categories to be able to benefit from their own lifelong learning efforts, and participate in those organized by others.

From the perspective of older workers, the development of education policies and systems and the work undertaken to promote the practice of lifelong learning, have been slow in reacting to their situation and learning needs. Indeed, the challenge in many countries is still fully to recognize them as a new group of learners. The new millennium, however, has marked significant progress in the lifelong learning policy formulations of the EU (Descy 2006; Nyhan 2006). Policy guidelines have also been formulated by the OECD, EU, ILO, and UNESCO. The G8 countries have stressed the importance of lifelong learning for everyone, and it is also seen as a key strategy to resist being made unemployed and also to position these workers well should they become unemployed. However, the degree to which the EU Member States have formulated their education policies and practice to realize these goals varies considerably as shown by the survey *National actions to implement lifelong learning in Europe* (CEDEFOP and Eurydice 2001). By 2006, the Member States were expected to have developed and implemented coherent and comprehensive lifelong learning strategies as specified in the *Education and training 2010 report*. However, bringing intentional lifelong learning into workplaces, to the benefit of older workers, has showed to be a slow process or even no process in many workplaces. This work is being continued in the EU's Europe 2020 Strategy, in which making lifelong learning a reality is one of its strategic objectives, and participation in it, alongside with adults' skills, are two key indicators for monitoring the progress towards the Lisbon objectives (European Commission 2011).

In many ways, professional workers sit outside many of these direct national government agendas, because other imperatives have seen the development of professional standards and the need for practicing professionals to demonstrate the currency of their professional competence in some occupations, and be subject to mandatory professional development activities in others. The mandates affecting other kinds of workers are not those facing professional workers, whose lifelong learning requirements are more likely to be dictated by professional bodies that regulate the occupation. For example, 13 of the 31 OECD countries presented in the latest *Education at glance* (OECD 2011) require that teachers participate in continuing training/education to maintain employment.

41.4 Participation in Lifelong Learning

41.4.1 Explaining Participation

There are a range of perspectives of how participation in adult education might be explained. These explanations have evolved over time and, therefore, draw upon differing historical-societal context and circumstances and also disciplinary emphases. Contemporary explanatory perspectives are informed by constructive accounts of adult learning emphasising 'human agency' (Billett 2008; Billett and van Woerkom 2008), conceptions of self and identity conceptions (Olesen 2006; Paloniemi 2006) and emotional competence (Gendron 2004, 2008) as explaining

Table 41.4 Participation in lifelong learning by age and education of older workers in 2012

Country	Age/group		
	All 45–54	All 55–64	High-educated 55–74
Austria	10.9	6.5	12.6
Belgium	6.1	3.9	7.0
Croatia	0.5	5.1	0.9
Cyprus	5.2	4.0	9.0
Czech Rep.	10.0	5.1	11.6
Estonia	8.6	4.6	7.6
France	4.6	2.3	4.9
Germany	5.3	2.9	4.8
Greece	1.0	0.4	1.3
Hungary	1.0	0.5	1.1
Ireland	5.4	3.2	6.2
Italy	3.8	2.4	6.8
Latvia	3.3	2.3	3.7
Lithuania	3.7	2.1	4.6
Luxembourg	10.4	6.0	9.9
Macedonia FYR	1.1	0.6	1.9
Malta	4.8	3.1	8.0
Netherlands	14.6	8.4	11.4
Poland	2.2	0.8	2.7
Portugal	8.3	4.5	10.4
Slovakia	2.7	1.3	3.7
Slovenia	10.7	6.8	16.8
Spain	8.0	5.0	10.0
Turkey	0.6	0.2	0.8
UK	15.0	9.6	17.3
Switzerland	29.6	22.5	33.9
Denmark	29.6	24.0	32.8
Finland	22.2	13.5	20.0
Iceland	21.2	19.2	33.4
Norway	17.1	10.2	16.1
Sweden	23.0	17.4	24.9

Source: Labor Force Survey and Adult Education Survey, EUROSTAT (2013). Lifelong learning refers to persons who received education or training in the four weeks preceding the survey

older workers' engagement in work, learning as well as professional development activities, such as continuing education and training. These perspectives are relevant when explaining older workers' participation behaviour.

41.4.2 Participation Rates in Lifelong Learning

Table 41.4 shows participation rates in lifelong learning among three age-groups of older workers in Europe in 2012, one of them (55–74 years) representing high-educated only. Several observations can be made from Table 41.4. Firstly, as

expected, participation is lower in the older age group among mixed education groups. Secondly, and again, there are great differences between countries. Thirdly, while the participation rates are generally low (in most countries below 10 % in both age groups) in the case of mixed education groups (45–54 years & 55–64 years), the situation in Northern European countries and Switzerland is very different with participation rates from close to 20 % and up to almost 30 %. Finally, the participation rates are highest among the high-educated in all countries, in spite that the upper age limit here is 74 years. Indeed, in this group the participation rates are in almost all countries higher than those of the youngest older workers here 45–54 years with mixed education. Generally, these findings confirm, once more, the accumulation hypothesis (Tuijnman 1991) in adult education: those with higher levels of education are more active in participating in new learning activities.

41.4.3 Major Issues Concerning Older Employees’ Participation in Lifelong Learning and Education

41.4.3.1 Participation Rates Tell Something but Not the Whole Story

Participation rates in continuing education and training provisions decline by age, with older workers participating less than younger workers. This finding has been consistent across various surveys. The findings show that there is unequal access to education (Findsen 2006) and that lifelong education is not a reality for all older workers (Descy 2006). Differences in initial education, poor health and inconsistent work opportunities in the labour market mean inequality in access to learning opportunities inside and outside of workplaces (Findsen 2006). These findings, however, are based on cross-sectional surveys and there is limited knowledge of individuals’ experience and progress over time, except in detailed, but small scale studies of individuals’ ongoing work and learning (Billett and Pavlova 2005). Certainly, older professional workers are not inherently disadvantaged in the ways that their counterparts in other occupational groupings seem to report (Dymock et al. 2012). Indeed, in interviews in Australia and Singapore, older workers reported having less interest in and reason to participate in training programs and often justify their decisions about participation. They claim these provisions are often perceived to be unhelpful, redundant and offered in ways that does not utilise their existing knowledge, nor effectively support their ongoing development. So, although older workers are sometimes portrayed as being resistant and reluctant participants in such programs, these informants provided a range of justification as to why they were reluctant to participate in these programs. Not the least was that they often believe themselves to be already competent in the areas addressed by such programs and that managers and supervisors routinely overlooked their competence and capacities to perform effectively in the workplace (Smith et al. 2013).

Certainly, many older workers have a relatively low level of education in comparison with younger workers. According to the UNESCO international standard classification of education, approximately one in four in the 30–34 year age group has a low level of education (i.e. at highest lower secondary education). Yet, in the 45–49 year age group this is the case for a third of that group, and for half of the persons in the 60–64 year age group (Descy 2006). However, these patterns are less likely to be the case for older professional workers. Again, in the studies from Australia and Singapore, older workers, many of whom were para-professional, high level service workers and some professionals, are reported being effective self-directed learners and able to learn much of the knowledge that is required to sustain their employability in their workplaces. These individuals were, generally, well-educated and reported being able to manage their ongoing occupational development requirements. Indeed, among the higher-educated, participation rates in training programs have been found to be high regardless of age (until close to 60 years), while the rates for the low-educated are low also in younger age groups (Tikkanen 1998). For instance, the European statistics show that highly educated people participate seven times more in lifelong education programs than their less educated counterparts whose participation decreases after the age 34 years (European Commission 2006, p. 36). So, rather than age, the issue for participation rates are levels of education, and in Bourdieu's terms, the level of social capital they possess (Findsen 2006) and/or the degree by which the conditions in working life are supportive of participation in continuing education and training (Gallenberger 2002 quoted in Reday-Mulvey 2005).

41.4.3.2 Older Professionals Prefer Non-formal, Hands-On Learning at Work

Older workers, including professionals, consistently report that they prefer learning in the settings in which they practice or work, rather than engaging in activities and interactions in educational institutions and through educational programs (Descy 2006; Billett et al. 2012). This holds for work life learning more generally (Kailis and Pilos 2005). The Eurostat data showed that on average 89 % of teachers had undertaken some professional development and that most often this was in a form of informal dialogue to improve teaching (93 % of teachers participating in teachers' professional development 18 months prior to the survey) and reading professional literature (78 %), while attending courses and workshops was also popular (81 %) developmental activity, but formal qualification programmes less so (25 %) (European Commission 2011). The formal learning activities were also reported to have less impact on learning than the informal ones. However, Descy (ibid) has concluded that even if older workers prefer learning in work settings, there may still be a great need for learning and competence development within the formal education system, and particularly where older workers lack certification for re-employment or advancement. Billett and his colleagues (2012) also found that there was a need to augment workplace-based learning experiences by accessing

experts, trainers or teachers. That is, bringing educational processes and expertise into the workplace and using these to enrich experiences and support available in workplace settings. However, this interest did not necessarily extend to workers being interested in attending courses, but rather having these more informed partners engaging with workers in the workplace when addressing work-related activities. That is, the developmental experiences were preferred and valued most when they were premised in these workers' practice and could be supported by more informed partners who understood the circumstances of practice and a particular context in which the work activities were undertaken. Going to training programs or having trainers in the workplace who did not understand the requirements and context for work performance are reported as being less satisfactory. So, what is consistently reported is that applicability both in terms of worthiness, but also in terms of effective learning, were valued by these informants. There were, however, some important exceptions to these general preferences.

41.4.3.3 The Youth-Oriented Formal Training Provision as Poor Design for Mature Learners

In most countries, the provision of tertiary education still largely reflects the needs of young people who are students. Hence, it is structured around opportunities for younger generations and, as typical in youth education, assumes a paternalistic stance of 'we know what's best for you' (Findsen 2006). A national study in Australia indicated that continued education and training provisions premised around entry level training dictates largely failed to meet the needs of mature aged workers who were seeking to develop further their work knowledge (Billett et al. 2011b). Findsen (2006) claims that although existing research has expanded the meaning of adult learning participation in the programs and how these educational provisions are conceptualized, organised and enacted, are premised on engagement with students, rather than mature age adults who happen to need to study. Indeed, although still not always the case, it is important to acknowledge workplaces as legitimate sites for lifelong learning, i.e. ongoing work-related learning. While younger adults may tend to take for granted the provision of educational opportunities, older workers tend to present as critical consumers of these services and, often, for good reason. This may be the case for the personal meaning of learning, learning contents, methods, and to learning outcomes. Consequently, older professional, in particular because of their high levels of qualifications, can pose a challenge to the needs of educators in such programs to 'justify themselves as experts' (Findsen 2006), particularly against their long-established bodies of knowledge that are utilized and proven on a daily basis. Moreover, the idea of a generic adult educator becomes increasingly remote and irrelevant as much of lifelong learning associated with working life might best occur in workplaces and be assisted by those who are more informed about the occupational practice and understand the requirements for performance and particular workplace.

The demographic changes, workplace imperatives and positioning of older professional workers outlined above suggest some key and specific measures are required for sustaining the engagement, participation and currency of these workers. They represent a clear and distinct subset of older workers generally and considerations for their professional learning need to be accommodating of these distinctions. Indeed, given that much of the difficulties older workers per se face are a product of low levels of education, perilous forms of employment and engagement in work that is not age tolerant, older professional workers represent almost an antithesis of these circumstances. Hence, in the next section, the discussion turns to what kinds of processes and provisions can support older professional workers' ongoing skill development.

41.5 Implications for Older Professionals' Learning and Employability

The considerations for the ongoing learning and development of older professionals are likely to be quite distinct from those of other categories of older workers. These workers are more educated, often occupy roles that are highly valued and subject to a range of opportunities for support and further development. Moreover, they may be far more in control of their options for employment and ongoing development than other categories of older workers. Studies of older professional workers in Australia and Singapore have suggested particular patterns of the preferred approaches to seeking access to learning support. These findings are now used to promote some observations about the ways in which older professionals might most prefer to engage in learning support arrangements which meet their needs for ongoing development. Older professional workers addressed both personal and workplace concerns. They indicated that their decisions to remain in the workforce was contingent upon the quality of their work and working life and the degree by which they found those to be rewarding. That is, the richness of their working life, including their ability to engage in tasks which they believe to be worthwhile and interesting, was central to their remaining in the paid workforce. Consequently, beyond efforts to continue to sustain their workplace competence, the further development of these workers' capacities is also likely to be associated with their willingness to remain in the workforce.

From those research projects, which comprise a series of interviews and a survey, certain patterns emerged about how these individuals preferred to engage in further developing their capacities. These are addressed here through a series of interrelated factors associated with: (i) reluctance to engage in training programs; (ii) beliefs about being able to contribute to others' learning; (iii) importance of being valued in the workplace as an important source of knowledge and learning; and (iv) preferred modes of learning.

41.5.1 Reluctance to Engage in Training Programs

The decreasing rates of participation in education and training by age are sometimes interpreted as older workers' reluctance to engage in training programs. The reluctance is seen as them not being interested in further developing their skills and capacities to work, thereby positioning them as being potential liabilities. However, what these workers reported was that they often found training programs to be irrelevant, not related to their needs and demeaning. That is, the contents of those programs were not always seen as being aligned with the kinds of development that they needed and required. Moreover, they also often reported that they believe they were quite competent in their work and were not in need of the kind of training programs to which they were invited. Then, they also suggested that the way these programs were conducted were often divorced from the kinds of practices that they were engaged in at work and the relationship between these programs and what they need to do at work was often quite remote. Moreover, they actually referred to often feeling demeaned by engaging in these programs. In particular, they often believe that they have much to contribute and that these programs positioning them as students and almost in deficit. Hence, they participated reluctantly or resisted such interactions. With the Singaporean older professional workers being positioned as a student and being taught by somebody younger than themselves, was culturally difficult. That is, the concept of filial piety – respect of those who are older and what they can contribute – is still held strongly by many older Singaporeans (Billett 2010b).

41.5.2 Beliefs About Being Able to Contribute to Others' Learning

Quite consistently older technical, paraprofessional and professional workers indicated that they believed they have something to contribute to other workers' learning. Therefore, rather than them being the objects of other people's efforts to assist them to learn, they in fact were well placed to assist others' learning. They referred to the range of experiences and capacities they had and how these were not always fully recognize or utilized by those who managed their workplaces. They provided quite convincing evidence of the ways in which they had develop their capacities through their work and were able to engage with emerging challenges and new workplace requirements, including new technologies. Although not uniform, or overly confident, these workers offered a perspective that they could contribute to other workers' learning in the workplace, and in particular, to the development of the capacities of younger or less experienced workers. Hence, they often struggled with how they were positioned as workers who needed their skills to be developed further, when they believed that their managers did not understand or appreciate the depth and range of their capacities which included those that could be used to assist others' learning.

41.5.3 Importance of Being Valued in the Workplace as a Source of Knowledge and Learning

Many of these older professionals emphasized the importance of them having a rich working life. It was factors associated with having unsatisfactory working life which would see them leave the workforce. Part of being valued was that they had contributions to make to the workplace and that these were a significant element of how they came to view the work and workplaces being worthwhile. Many of these informants suggested that their interest in advancement and promotion was quite limited but that they were generally interested in being seen as being a valued and respected employee. Central to this was being seen as a source of knowledge which could be utilised and engaged with by others to assist their learning and development. The importance of sense of self and their standing as workers, and beliefs about the contributions they could make to others' learning, were key considerations in their retention within the workforce.

41.5.4 Preferred Modes of Learning Support

These workers also identified a series of preferences for their learning. Much of this was associated with their engagement in everyday activities and interaction in the place of work. They pointed to the ways in which this mode of learning had been helpful for them to continue to learn across their working lives and to respond effectively to the many changes in the workplace requirements that they had had to meet. Indeed, all of the informants were able to identify significant changes to their work and working life which they had to respond to effectively in order to remain employable. Repeatedly, the means by which they had responded was through their everyday learning experiences in practice and assisted by others. However, some of these workers did acknowledge that there were circumstances and activities in which they needed assistance to sustain their workplace skills currency. That is, there was a need for engagement in particular experiences and with particular people to sustain the currency of their working knowledge.

One approach suggested by number of these workers was the ability for them to engage with others so that they might both share what they knew and also learn from others. Such an interaction might be termed a learning dialogue (Vella 2002), with reciprocal sharing and learning occurring. What was suggested by these workers is that they would like to find themselves in situations where current issues and workplace challenges are discussed and they are able to contribute to those discussions but also learn through them. This kind of pedagogic practice might well seem to be a practical and applicable model for ongoing development of mature age professional workers as the learners are not positioned as students being taught by somebody but rather as co-participants in a collaborative process of learning and development.

A key pedagogic or “gerogogic” attribute here is that the status and standing of these mature age professional workers is acknowledged from these processes and they are commensurate with their sense of self, contributions and experience. Implementation of this kind of workplace pedagogy can take place as part of everyday professional work and in practice settings, and even through everyday practice activities. In this way, authentic and pressing issues can be addressed in ways which draw upon a range of experiences and understandings, and through such a process both individual development and the collective capacities of the workforce can be potentially developed. Such an approach, although stands in contrast to the ubiquitous training program and the model being taught, does not deny the importance of training programs, external experts or consultants as and when they are required, particularly, the instance, when the knowledge that is required to be learnt is not available in the workplace. The approach outlined above suggests that two important elements need to be included within training programs. Firstly, they need to be enacted in the ways which acknowledge, respect and utilise the expertise and capacities of those who participate in them. That is, not to be presented as a didactic process of knowledge transmission, but rather one which seeks to build upon and engage with the participants knowledge and ways of knowing. Secondly, such training provisions need to be aware of and are lined with the particular requirements of the workplace. So-called generic training is often seen as being quite irrelevant because they are removed from the bases by which it is seen to be applicable in the participants’ workplaces and responsive to the issues they are facing.

41.6 Summary and Conclusions

This chapter has illustrated and discussed how older workers are becoming an increasingly large component of nation’s workforces and the composition of workers in most workplaces. Whilst there are a range of issues that confront older workers more generally, such as age-related bias (Taylor and Walker 1998), the difficulty – as the experience in terms of participating in and having opportunities for learning – appear to be quite differentiated across the entire cohort of workers aged over 50.

We have proposed that professional workers are relatively better placed than their less educated counterparts, and considerably more so than those who are engaged in lower status occupations and have disjointed work lives. In all, older professional workers are often in a strong position to negotiate their work and learning, with considerable access to flexible working time and conditions. Furthermore, the increasing need for high-skilled workforce together with shrinking younger generations, are likely to make them even more attractive employees in the future labour markets. Participation rates of these workers in lifelong learning are generally high, across countries. Yet, these workers also have preferences for how they want to learn. Studies have identified ways in which those preferences can be enacted within work and workplaces. Occasional reluctance by these workers to participate in training programs, should not be interpreted as a lack of interest in learning and

ongoing development, when quite the opposite is the case. Indeed, older professional workers strongly emphasize the importance of ongoing learning, being often also responsible to manage and secure the learning required. What the workers interviewed in Australia and Singapore suggest is that they are a resource, which may well be underestimated or misunderstood in terms of their potential contributions to the workplace, but also to others' learning (inter-generational learning in the workplace). They themselves prefer an approach by which their ongoing learning and development can be secured collaboratively and dialogically. This kind of process can be readily enacted within the workplace and is part of work activities in many professional sectors as convened processes. Whilst these workers often emphasize the importance and utility of training programs, they also acknowledged that there is sometimes new learning which is required that cannot be learnt through such processes. A key lesson in how training programs should be designed and enacted, is to frame them within the requirements of the participants' workplaces and to use means, which engage effectively the participants, are those which are likely to be seen to be worthwhile and worth participating in.

The chapter proposes that the ongoing development and employability of older professionals is likely to be central to national economies in decades to come; that it is necessary to have an adequate fit between provisions of various forms of learning opportunities in and outside workplaces, to support individual skills currency and national innovation capacity, and; that distinctive for older professionals is a high extent of personal choices available for their work and learning, necessitating a concerted public and private effort, in broad cooperation among relevant partners, when seeking solutions for extended job-careers in line with prolonged life-spans.

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Chapter 42

Promoting Practice-Based Innovation Through Learning at Work

Per-Erik Ellström and Per Nilsen

Abstract This chapter defines the concepts of innovation and practice-based innovation and describes some key characteristics of practice-based knowledge and research-based knowledge and how these two types of knowledge can be integrated to facilitate creative learning and practice-based innovation. Creative learning is assumed to occur when individuals or groups in an organization question established thought and action patterns and break away from routinized, habitual procedures to develop new ways of handling the duties and tasks involved in a job. In this way, creative learning can be a driving force for change and innovation in organizations. Reflection in the workplace is proposed as a mechanism for facilitation of creative learning and practice-based innovation. Although the literature on reflection provides strong arguments in favour of such activities, empirical research has described many challenges to reflection in the workplace. Reflection is often not allotted

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formal priority on the management agenda. Yet the potential of reflection cannot be fully realized without formalizing reflection as an expected legitimized activity in the workplace.

Keywords Innovation • Practice-based innovation • Research-based knowledge • Practice-based knowledge • Workplace learning • Adaptive learning • Creative learning • Reflection

42.1 Introduction

In general terms, professional work can be defined as the application of abstract, often scientific knowledge to particular cases (cf. Abbott 1988; Brante 2010; Freidson 2001). Although this definition emphasizes important features of professionalism, it is at the same time too narrow considering the increasing complexity of professional work, the need to handle multiple and sometimes contradictory demands, together with increasing performance and accountability pressures (Adler et al. 2008; Freidson 2001; Jensen et al. 2012). Furthermore, as argued by Jensen et al. (2012), the knowledge base of much professional work is in many respects uncertain and continually changing, and the tasks of professionals often go beyond the application of predefined knowledge to handle particular cases.

In response to these changes and pressures, it has been argued that new patterns are emerging in the organization of professional work (Adler et al. 2008). These emerging patterns are expected to include increased emphasis on continuous learning and renewal of professional competencies; teamwork and inter-professional collaboration; evidence-based practice, performance improvement, and systems for innovation grounded in daily practice. If this picture is correct, there is a need for research on professional work not only as traditionally defined but also from perspectives that emphasize knowledge creation, learning and innovation. Such a broader focus means that the creation of knowledge is assumed not to be an exclusive task of the research community (Lindblom and Cohen 1979; Nonaka et al. 2001). New knowledge is viewed also as created in practice, for example, through interactions with colleagues and other professionals, or through the necessity of handling emerging problems and challenges in the course of work.

In line with such a view of the organization of professional work, this chapter discusses issues of workplace learning and innovations, in particular innovations in professional practices, working methods or organizational routines and processes, that is, different kinds of process innovation (Edquist et al. 2001). The emphasis is on intra-organizational innovation processes rather than inter-organizational processes. This focus may be seen as a limitation given the recognized importance of networks and learning in interplay with other organizations, which often form part of an innovation system approach (Edquist 1997; Lundvall 1992). However, process innovations stem from intra-organizational learning processes to a greater degree than product innovations relating to goods and/or services (Hommen 2000).

More specifically, the purpose of this chapter is to describe how the development of practice-based innovations can be promoted by creative learning made possible through the deliberate use of research-based knowledge in order to challenge and critically explore well-established attitudes, beliefs, and practices in professional work. Practice-based knowledge built up through experience is needed to obtain expertise and skills in occupations and work tasks. However, once established, this knowledge is difficult to relearn and change, and it may thus inhibit learning and innovation processes. In view of this, a central argument of this chapter is that arrangements for promoting critical reflection can be used as a means to facilitate creative learning involving scrutiny and possible revision of prevailing thought and work patterns, which is required for innovations to occur.

The text begins with an introduction to the concepts of innovation and practice-based innovation. An explanation of the concepts of research-based and practice-based knowledge is followed by a discussion of the limitations of practice-based knowledge to achieve learning that leads to development of new solutions and ideas. The concepts of adaptive and creative learning are introduced and explored. This is followed by a discussion of the potential for using research-based knowledge to achieve creative learning and a description of the process of integration of research-based and practice-based knowledge. The next section elaborates on the concept of reflection and how it can yield creative learning. The concluding section addresses some of the challenges involved in achieving reflection in the workplace.

42.2 The Concept of Innovation

Central to many definitions of the concept of innovation is the criterion that an innovation relates to some form of specific change that is new (at least locally) and that leads to what is in some sense a better accomplishment of goals at the system level (the local unit or the larger organization/system of which it is a part). The goals do not necessarily have to be financial or production oriented but may relate to other values that we want to achieve by means of certain operations, for example, meeting the needs for health care, care or education. These or similar criteria recur in both earlier and more recent definitions. An early example is the definition proposed by the educational researcher Matthew Miles. According to this definition, an innovation is “A deliberate, novel, specific change, which is thought to be more efficacious in accomplishing the goals of a system.” (Miles 1964, p. 14).

Miles’ definition, proposed several decades ago, seems in many ways still relevant today. Let us first consider the requirement of novelty. This gives rise to the classic question: new for whom? Do we mean new for the user in a local context, new for a certain industry or sector, or new for the world? It appears to be quite common in the field of innovation research to accept a low innovation ceiling, that is, to accept something as an innovation if it is perceived as new in the local context in which it is developed or implemented, even though its novelty may be more limited in a wider context (Miles 1964; Pettigrew and Fenton 2000). However, such

local innovations are not mechanical applications or simple copies of a more general idea or innovation. It is difficult to draw a clear line between imitation and innovation. What may appear to be an imitation often entails a reinterpretation or new interpretation involving more or less innovative elements (Sevón 1996). This is in line with the view that innovations are based on new combinations of elements that are already well known, and perhaps also applied, but have not previously been linked together – at least not in the local context (Pettigrew and Fenton 2000; Schumpeter 1980). This argument leads us to the distinction between gradual (incremental) and radical innovations (Edquist et al. 2001). In the case of gradual innovations, the focus is on changes that entail refinements or improvements, although without accomplishing anything that is completely and fundamentally new. In the case of radical innovations, the focus is instead on changes that represent something totally new and thus also entail a break with established views, knowledge or technology.

According to many definitions, there is also the requirement that before something is accepted as an innovation, it must be possible to demonstrate that it contributes to the accomplishment of the goals of an organization (or system). This requirement is reasonable in the later stages of an innovation process, but hardly in the early stages. One way of handling this is to differentiate between potential and actual innovations. A potential innovation entails a proposed change that is in some sense new. However, it has not yet been demonstrated that the proposed change will contribute to the accomplishment of the goals of the system (or be of importance to a group or operation in some other way), and it cannot therefore be legitimized in terms of results or its importance to others. An actual innovation is an innovation the importance of which has been possible to demonstrate (as a contribution to goal accomplishment or in some other way), or which has for other reasons achieved a certain degree of acceptance and legitimacy and, as a consequence, a certain degree of dissemination and use. Thus, what constitutes an actual innovation – rather than a creative idea, invention or discovery – can only be determined on the basis of its practical application and use. What are accepted as arguments in favour of a certain innovation depend in many cases on the power and authority of the actors concerned. Power differences, for example, between different departments or between individuals or groups with different status are likely to influence whose arguments for or against a certain potential innovation are recognized as valid and legitimate (e.g. Pettigrew and Fenton 2000).

So far, we have discussed innovations as changes in quite general terms. In the definition by Miles (1964) cited earlier, innovations can relate to more or less any aspect of an operation. But what type of changes are we talking about more specifically? A well-known framework is based on the distinction between product and process innovations (Edquist et al. 2001). Product innovations relate to new goods or services, whereas process innovations relate to new ways of producing existing goods and services. The process innovations category may in turn be divided into technical and organizational innovations. Technical process innovations include new material goods (e.g. machinery, IT equipment) that come into use in a certain production process. Organizational process innovations relate to new ways of

organizing a certain work process (e.g. a new work organization or a new working method). Although this division is not precise and, as pointed out by Edquist et al. (2001), is far from unequivocal, it is usable in many contexts. Thus, in the remainder of this chapter, our focus, in terms of this division, is on process innovations rather than product innovations, and on organizational rather than technical process innovations.

42.3 Practice-Based Innovation

According to a predominant view, innovations are the result of technological progress and planned investments in research and development. However, as is widely recognized, innovations can also be a function of the informal learning and ongoing knowledge creation that takes place in the production of goods and services in organizations (e.g. Edquist 2005; Lam 2005; Lorenz and Lundvall 2006; Jensen et al. 2007). Elaborating on this theme, Jensen et al. (2007) distinguish between two ideal-typic modes of learning and innovation, called the science, technology and innovation (STI) mode and the doing, using and interacting (DUI) mode. The STI mode relies primarily on explicit and codified knowledge derived from research; the DUI mode relies mainly on experience-based know-how (implicit knowledge) acquired through informal processes of learning on the job, for example, through employees' efforts to find solutions to emerging problems in daily practice. As argued by Jensen et al. (2007), the DUI mode of learning at work enhances the knowledge and skills of the employees, and may also result in more efficient ways to organize work and solve emerging problems at a team or an organizational level, for example, in terms of new shared routines. Thus, an important implication of the DUI mode is the need to consider the workplace not only as a site for production but also as a site for learning and innovation.

A practice-based perspective on innovations is not new, however. In the 1960s, researchers (e.g. Arrow 1962) noted that innovations could be the result of experience-based learning at work. Despite the long intellectual history of the DUI mode, a science-based view of innovation is still predominant among scholars as well as policymakers (Jensen et al. 2007). The predominance of the STI mode of innovation is in a sense parallel to the predominance of the traditional science-based view of professional work that was discussed in the introductory section. In analogy to the traditional view of professionalism, the predominance of a science-based (STI) mode of innovation is also strongly challenged by results from empirical research. A number of studies indicate that learning through work is likely to promote innovations, and that organizational practices such as project teams, problem-solving groups, job and task rotation can contribute positively to innovative performance. Furthermore, it seems that organizations that combine the two modes of learning are more innovative than those relying primarily on one mode or the other (Jensen et al. 2007; Lorenz and Lundvall 2006; Lundvall and Nielsen 1999).

If we explicitly turn to the notion of practice-based innovation, the DUI mode of learning and innovation as discussed earlier can be seen as a way to define and empirically explore this concept. However, the conceptual framework suggested by Jensen et al. (2007), although seemingly fruitful both theoretically and empirically, leaves open issues related to the meaning of learning and how learning and innovation are related. Therefore, there is a need to move the discussion further into an analysis of the phenomenon of practice-based innovation and its links to processes of learning.

The concept of practice-based innovation as used here refers to professionals' renewal of their own operations in some respect, for example, by developing and implementing new working methods, routines, products or services, where this renewal is an outcome of workplace learning processes within the operations concerned. Thus, the proposed definition has its focus on learning at work as a fundamental mechanism behind practice-based innovation processes. The definition is thereby an example of an endogenous bottom-up approach to innovation in contrast to traditional approaches, which assume that innovations are primarily the result of top-down decision making and implementation of exogenously developed solutions. However, relating to the distinctions made earlier between different aspects of innovations, practice-based innovations are not by definition merely improvements or incremental innovations, but can in principle be more or less radical, and thus represent a break with established views, knowledge or technology.

How, then, can we understand the relations between learning and innovation that are emphasized in the definition given above? Although this issue is the main topic of the remainder of this chapter, some general remarks are made here on the basis of previous work on these and related issues (for a recent review, see Høyup 2012). First, although we want to distinguish learning and innovation analytically, they are in practice closely related and, in principle, reciprocal: learning might promote innovation and vice versa. In line with this, practice-based innovations viewed as changes at a team or organizational level (e.g. new routines, product improvements, new physical structures) are assumed to be mediated by individual learning in terms of, for example, new ideas, knowledge or skills (Ellström 2001). As developed further later in the text, practice-based innovation processes typically begin with some kind of challenge or problematic situation in, for example, the conduct of a task, which leads to a break with habitual patterns of thought or action, and a search for new ways of dealing with or solving the problematic situation at hand (Ellström 2010a). Billett (2012) makes a similar point, arguing that learning and innovation at work are assumed to occur more or less constantly as individuals respond to emerging challenges in their everyday work, and that employees' learning and their transformation (remaking) of work practices occur interdependently of each other (see also Billett et al. 2005).

Second, following the classic work by Schumpeter (1980), it was argued earlier that innovations are based on new combinations of elements that are already well known, and perhaps also applied, but that have not previously been linked together, at least not in the local context. Using the notion of enmeshment, similar ideas have more recently been proposed by Price et al. (2012) based on a series of case studies.

According to these authors, innovations at work emerge through the daily practices in a workplace, where employees, consciously or unconsciously, vary ongoing practices and combine elements of existing practices with elements of similar practices from other contexts.

Third, a central idea in the definition of practice-based innovation given earlier is that of workplace learning as a driving force for innovation, and, thus, processes of learning at work may have practice-based innovations as possible outcomes. Following Evans et al. (2006), workplace learning can be defined as: “learning that takes place in and through the workplace and derives its purpose from the context of employment.” (p. 9). The concept of workplace learning may, in a specific case, include both informal and formal learning, or only one of these forms. Informal learning refers to learning that occurs regularly in work as well as in everyday life, but subordinated to other activities (e.g. work activities) in the sense that learning is not their primary goal. The notion of formal learning, in contrast, refers to planned and organized learning activities (e.g. internal or external courses) with learning as their primary goal, and where the participants can be certified as a result of successful accomplishment of the learning goals. Although there is limited research concerning the effects of workplace learning programmes on individual participants and organizations, available studies indicate a range of cognitive and attitudinal outcomes that are likely to prepare employees for participation in innovative work practices (e.g. Ellström and Kock 2009; Evans et al. 2011; Kock and Ellström 2011).

Of particular interest in the present context is the finding reported by Waite et al. (2012) that learning arrangements in a workplace that combined formal and informal learning seemed to encourage employee involvement in innovative work practices (see also Evans and Waite 2010). The latter finding is interesting from the perspective of the results reported by Jensen et al. (2007) concerning the increased innovativeness of organizations that manage to combine a science-based (STI) and an experienced-based (DUI) mode of learning. These findings are also in line with the main theme of this chapter, that is, the idea that learning and innovation can be facilitated through efforts to integrate research-based and practice-based knowledge in professional work. However, before we turn more directly to this idea, we define and clarify our use of the concepts of research-based and practice-based knowledge in the next section.

42.4 The Distinction Between Research-Based and Practice-Based Knowledge

Professional work as traditionally defined (e.g. Abbott 1988) is about putting research-based (scientific) knowledge to use in relation to particular cases. However, as was argued in the introductory section, this view of professional work appears too narrow and simplistic today. Increasingly, professionals also need to consider and solve problems based on knowledge acquired in and through their daily practice, that is, through continuous learning and in interaction with colleagues, clients

Table 42.1 Key characteristics of research-based and practice-based knowledge

Characteristics	Research-based knowledge	Practice-based knowledge
Rationale for knowledge development	Obtaining improved understanding or explanation of problems	Finding solutions to problems
Desirable knowledge attributes	Relevance to a wider sphere than the specific research situation. It is also desirable that the knowledge has been developed in a process that is accessible to and understandable by others	Hands-on use in concrete, everyday situations
Applicability of the knowledge	Applicability beyond the specific research situation	Context-specific, which restrains applicability beyond the specific situation
Articulation of the knowledge	Explicit, codified knowledge, primarily expressed in writing	Usually tacit knowledge expressed in action
Ease or difficulty with which the knowledge is shared	Easy to share	Difficult to share
Accessibility and availability of the knowledge	Public, available in certain channels, e.g. journals and reports	Unique, personal and difficult to access

and other actors (e.g. Adler et al. 2008). Thus, professionals need to use research-based as well as practice-based forms of knowledge.

How, then, can we define and use these concepts? Research-based knowledge can be characterized as explicit and general; practice-based knowledge is tacit (implicit) and more local in character (cf. Jensen et al. 2007). These and some other key characteristics of these two types of knowledge are summarized in Table 42.1, which presents a simplified dichotomization (Nilsen et al. 2012).

At least two things should be emphasized. First, the distinction between research-based (scientific) and practice-based knowledge, although basically useful, is sometimes overstated or drawn too sharply (Giddens 1990; Lindblom and Cohen 1979).

However, as used here, the division between the two forms of knowledge is considered as ideal-typic in character and made for analytical reasons. In practice, the two forms of knowledge should be seen as two complementary knowledge dimensions or aspects that are closely interwoven in occupational practices and presuppose each other in the sense that neither form of knowledge can stand alone (cf. Nonaka et al. 2001). For example, the understanding and use of explicit research-based knowledge presupposes a pre-understanding that is tacit and experience-based in character. Conversely, as argued later, practice-based knowledge is quite limited for understanding and handling novel and/or more complex problems in daily practice.

Second, a number of other authors have proposed distinctions between different types of knowledge similar to the one proposed here. Many of these distinctions have their conceptual roots in the well-known distinction proposed by

Gilbert Ryle (1949/2002) between “knowing-that”, that is, declarative or propositional knowledge (knowledge of facts) and “knowing-how”, that is, procedural knowledge (knowledge of how to perform a task). Others have expanded on these concepts, for example, Eraut (1994) in his analysis of professional knowledge and competence. Lundvall and Johnson (1994) proposed a distinction between four types of knowledge, called know-what, know-why, know-how, and know-who. Gibbons et al. (1994) distinguished between two types of knowledge production. Mode 1 referred to academic, investigator-initiated knowledge production, not unlike the concept of research-based knowledge as used here, whereas mode 2 referred to socially constructed knowledge by multiple actors in specific contexts, that is, a concept that is somewhat similar to the concept of practice-based knowledge.

In line with the analysis presented by Gibbons et al. (1994), it can be argued that the distinction between the two forms of knowledge proposed here is best understood in terms of the different processes and circumstances through which their knowledge claims are recognized. If we first consider research-based knowledge, this form of knowledge is scientifically grounded and generated in a highly structured and meticulous process, which typically begins with a thorough analysis of the problem under study. Different types of problems can also be the starting point for developing research-based knowledge, but such processes typically involve a great deal of problematizing of the issue under study before research questions are formulated and the issue is investigated. Thus, research-based knowledge can rarely provide quick instrumental solutions to problems. In contrast, practice-based knowledge predominantly serves to solve the problems that occur in everyday life and work, which means that the knowledge has a rule-based character, and is connected to specific situations or contexts. Furthermore, whereas research-based knowledge typically has ambitions for applicability beyond the immediate boundaries of the specific study, the subjective and context-bound nature of practice-based knowledge limits its generalizability (Nilsen and Ellström 2012).

As mentioned earlier, research-based knowledge is explicit and primarily articulated in different types of text, which facilitates communication and knowledge exchange. A broader definition of research-based knowledge includes other forms of codified knowledge that may not have been subjected to such a rigorous quality control process, for example, different types of reports and presentations of results. Practice-based knowledge, on the other hand, tends to be tacit (implicit), and expressed through action rather than words. Practice-based knowledge can therefore be difficult to access and communicate to others (Nilsen and Ellström 2012). However, tacit knowledge can be converted into explicit knowledge in the form of rules, directives and work routines, thus generating organizational learning (Grant 1996; Nonaka et al. 2001; for a review of research on knowledge creation and organizational learning, see Ellström 2010b).

Thus, our main point so far is that research-based and practice-based knowledge are closely interwoven dimensions of the knowledge that informs professional practices. It is rarely an either/or choice for practitioners, but more often a question of making sense of many different types and sources of knowledge, some of which

may be research-based and others that are practice-based. By implication, in practice it is neither possible nor desirable to draw a strict line of demarcation between these two types of knowledge. Fitzgerald and Dopson (2005) view the relationship as circular, stating that the two knowledge aspects reinforce each other as they become woven together. Nonaka et al. (2001, p. 497) describe a “spiral of knowledge creation” that can be set off by the interaction between tacit and explicit knowledge. Furthermore, both forms of knowledge may dominate under different circumstances, and the extent to which different knowledge types are utilized can depend on factors such as education, profession or type of activity (Nilsen 2010). In the next section, we consider more closely the interplay between research-based and practice-based knowledge in daily practices, and, in particular, how explicit knowledge can be utilized and further developed in practical action through processes of adaptive and creative learning.

42.5 Learning and Innovation

Practitioners in many occupations are often required to deal with well-known, routine tasks as well as new or unknown problem situations (Billett 2012; Olsen and Rasmussen 1989). Their actions in the former type of situation are likely to be habitual and routinized and based on tacit (implicit) knowledge, whereas actions in non-routine situations are better described as deliberate and reflective, based on explicit knowledge. Thus, it can be argued that practitioners’ use of knowledge in their daily work to a large extent depends on the task or situation at hand. Based on theory and research within the field of cognitive action theory, Ellström (2006a) expanded on this line of thought by conceptualizing practitioners’ use of knowledge and learning at work as interplay between four levels of action involved in carrying out a task:

1. *Skill-based action*, that is, routinized (automatized) actions that are typically performed smoothly on the basis of tacit (implicit) knowledge and with little subjective effort, conscious attention or control;
2. *Rule-based action*, that is, actions that are performed on the basis of a rule or procedure that is based on experience (learning) from similar previous occasions, instructions or communication with others;
3. *Knowledge-based action*, that is, actions that are consciously controlled, generated and selected on the basis of analyses of tasks and goals in relation to factual knowledge and/or more general theoretical knowledge that, in principle, can be articulated and codified; and
4. *Reflective action*, that is, actions based on evaluations and reflections concerning not only the performance and consequences of actions but also reflections concerning the task and the goals at hand (cf. the notion of reflection-on-action as proposed by Schön (1983) and the notion of critical reflection as discussed by Mezirow (1991)).

A basic assumption behind this model is that the four levels of action entail the use of different types of knowledge (Bargh and Chartrand 1999; Frese and Zapf 1994). More specifically, it is assumed that practice-based knowledge is used primarily (although not exclusively) at the first two levels of action, that is, at the skill-based and the rule-based levels, whereas research-based (theoretical) knowledge is used at the levels of knowledge-based and reflective actions. Although the levels of action are organized hierarchically, working at one level of action does not exclude parallel or integrated activity at other levels. The optimal handling of a certain task may require performance at different levels, in sequence or in parallel (Olsen and Rasmussen 1989). Higher-level cognitive functions are assumed to monitor ongoing actions and to anticipate upcoming problems and demands in the environment. In line with the latter idea, Giddens (1984) refers to the “reflexive monitoring of action” to indicate the active character of routine actions. In reflective processes of this kind, logical inconsistencies as well as self-reflection become of focal concern, which also makes a reliance on meta-cognitive knowledge necessary, that is, knowledge about oneself and one’s own knowledge, its scope and limits, strengths and weaknesses (e.g. Eraut 2004; Flavell 1979).

42.5.1 Developing Practice-Based Knowledge and Routines Through Adaptive Learning

Practice-based knowledge and the consolidation of thought and action patterns as routines or habits may be seen as a way to successfully cope with the daily flow of events, problem situations, and contradictory demands, while maintaining a sense of security and stability in life (Giddens 1984). We are then likely to act primarily at a skill-based and/or a rule-based level of action. A good example would be our tendency to develop cognitive shortcuts (heuristics or rules of thumb) concerning how something works and what is possible and not possible, how things should be seen, and what outcomes are likely (Gigerenzer and Todd 1999; Gladwell 2005; Lehrer 2009). There are also shortcuts in the form of habits that are more or less automatic responses that develop through learning as behaviour is repeated in the same context (Verplanken and Wood 2006).

Cognitive shortcuts and habits can be very efficient for dealing with new situations by treating them like something that has been encountered before. They preserve crucial time, energy and mental capacity, thus freeing mental resources for other purposes, including creative work and innovations. Cognitive shortcuts essentially leap frog over analysis to reach conclusions without going through the intermediary steps required for questioning and, if necessary, modifying perceptions, thoughts, feelings and behaviours (Rushmer and Davies 2004). This kind of process is also in line with theories on ego defense and perceptual set, which explain why people are less likely to act on new information and may even avoid information that challenges present attitudes, beliefs and behaviours (Cramer 1991; Nevin 2006).

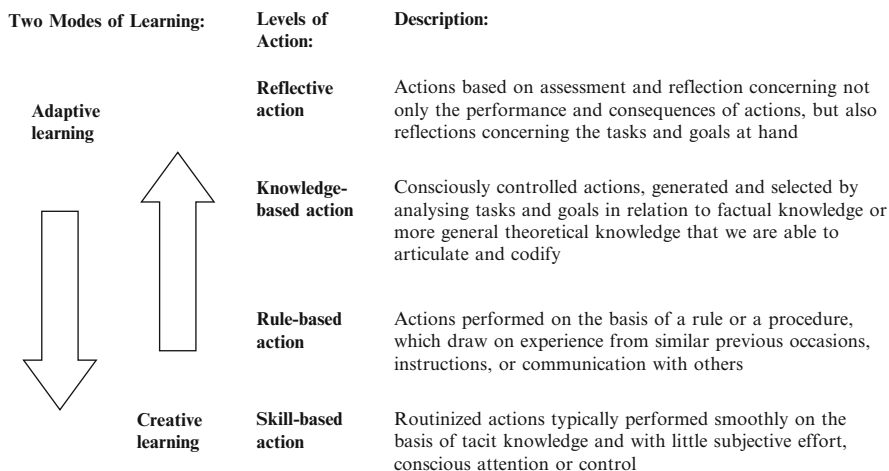


Fig. 42.1 Four levels of action and two modes of learning

Cognitive dissonance theories posit that people bring attitudes, beliefs and behaviours into line to reduce unpleasant feelings of dissonance (Festinger 1957). The human tendency to avoid the unknown in favour of the familiar, certain, and controlled can also function as a barrier to change.

Inertia to change can also be seen at group and organizational levels. Colleagues can convey strong group norms and role expectations that constrain change in a group (Conner and Norman 2005), whereas the dominant logic of an organization (e.g. the cultural norms and beliefs concerning where an organization comes from and what it stands for) can function as a filter to screen out information that does not conform, thus reducing the organization's perceived need to change (Schein 1985).

The development of practice-based knowledge and the establishment of routines or habits for handling recurrent problems and demands in daily life occur through what has been called adaptive learning (Ellström 2001, 2006a). This mode of learning (Fig. 42.1) is conceptualized as a process in which the individual (or group) learns to handle a certain task or situation at a skill-based level of action, that is, in a routinized way. Instances of adaptive learning are easy to find in organizations, including, for example, the mastering of new tasks or situations, or learning to follow certain instructions. Adaptive learning is also central to the socialization of individuals to an organization. The focus then is to what extent the people in an organization are acquiring the code, and thus learning how one should or must think and act in different situations. Adaptive learning yields efficient, effective and reliable task performances that are stable over time. Variations in performance within and between individuals in an organization are reduced, promoting homogeneity (Ellström 2010a). In line with this, the decisive criterion for successful adaptive learning is that the task concerned can be performed rapidly and with a low percentage of error (Argote 1999; Argyris and Schön 1978; March 1991). In practice, measures

to reduce variation in the performance of a task may include formalization through written rules and instructions, limited autonomy through standardization of work processes, and the formulation of highly specified tasks and goals.

Adaptive learning (like other forms of learning) does not take place easily, however. The literature is full of cases where the implementation of prescribed working methods, procedures or policies has failed (implementation failures). At the same time, what on the surface appears to be a successful implementation may, on closer examination, prove to be a pro forma adaptation to stipulated work processes; that is, learning has taken place in the sense that people have picked up the prescribed way of perceiving and speaking (rhetorical learning), but they have not appropriated the prescribed work process in practice (Wertsch 1998).

However, once established, routinized actions are very difficult to change, especially if one relies on intellectual and verbal forms of education and training (Frese and Zapf 1994). People function well at a routinized level of action until problems or surprises of one kind or another arise (Gersick and Hackman 1990). These observations are clearly in line with Dewey's (1933) view of reflection as a process that begins with a perceived difficulty or disturbance in a routinized task or situation. However, as mentioned earlier, routinization may also impede our detection and management of contextual changes or disturbances (Gersick and Hackman 1990). In consequence, in many situations we tend to ignore or misinterpret changes in our surroundings in order to maintain existing structures and patterns of thought and action. Thus, learning that is based only on practice-based experiential knowledge is not sufficient to challenge the prevailing status quo of well-learned and routinized thought and action patterns.

42.5.2 Creative Learning as Breaking Away from Routines and Opening Up to Innovation

Adaptive learning can be contrasted with creative (or developmental) learning (see Fig. 42.1), which is associated with questioning and possibly revising established perspectives, routines and practices. Creative learning is also broadly similar to concepts such as Argyris and Schön's (1978) "double-loop learning", Engeström's (1988) "expansive learning" and Mezirow's (1991) "transformative learning". Creative learning is assumed to occur when individuals or groups in an organization question established thought and action patterns and break away from routinized, habitual procedures to develop new ways of handling the often complex tasks involved in a job. The focus is on promoting and exploring variation and diversity in thought and action, which means that creative learning calls for risk taking, acceptance of failures, and scope for experimenting with and testing alternative ways of acting in different situations (Ellström 2006b, 2010a).

Creative learning entails an upward movement from the level of skill-based (routinized) action to the level of knowledge-based or reflective action. This type of learning could be expected if an individual (or group), while working at a routinized

level of action, encounters an unfamiliar problem or a new situation for which there is no ready-made rule or solution available (cf. Gersick and Hackman 1990). In such a situation, the alternative to seeking a solution through trial and error is to engage in a process of problem solving at a knowledge-based or reflective level of action. Thus, under certain conditions, creative learning can be a driving force for change and innovation in organizations (Ellström 2010a). One important condition for this to happen is the planned or unplanned variation that always exists in the performance of work. Such variation may lead to discoveries, ideas, and new actions that, under certain conditions, can transform established routines and practices in an organization (Miner et al. 2001).

Opportunities for creative learning in an organization depend on a complex interplay between a range of factors, including task characteristics (complexity, variety and control), opportunities for feedback and evaluation, the type and degree of formalization of work processes, organizational arrangements for employee participation in problem handling and developmental activities, and learning resources in terms of time and possibilities for knowledge exchange (Ellström 2001, 2006b). Creative learning requires sufficient scope and resources for experimenting with and testing alternative ways of acting in different situations, that is, a high degree of autonomy (McGrath 2001). However, the degree of autonomy in performing a task appears to be a necessary but not sufficient precondition for creative learning. In addition, as discussed extensively elsewhere (Ellström 2001), individuals or groups must have the subjective capacity required to make use of the autonomy afforded by their jobs. In general terms, such change-oriented or innovative capacities can be defined as an individual's ability to act knowledgeably, effectively, deliberately, strategically and reflectively in a situation (Svensson et al. 2004). The extent to which individuals can be expected to develop such capacities is related to, among other things, previous experience with similar tasks, the individual's knowledge and understanding of the task at hand, self-confidence, and occupational identity. Many of the characteristics and traits associated with creativity are also beneficial to creative learning; for example, openness to experience, imagination, drive, ambition, independence and nonconformity (Feist 1999).

42.5.3 Innovation as a Balancing Act Between Adaptive and Creative Learning

Creative learning is often assumed to be beneficial, in contrast with adaptive learning, which is implicitly understood to be less valuable. However, both adaptive and creative learning have important functions and should be seen as complementary modes of learning in relation to innovation processes. An overly strong emphasis on adaptive learning means that issues of habitual performance and efficiency are likely to dominate over idea development and change. Conversely, too strong an emphasis on creative learning entails a risk that issues of creativity, innovation and renewal drive out concerns related to the efficiency and stability of current practices

(Ellström 2006b). Elmholt and Brinkmann (2006, p. 179) caution that an exclusive focus on creative learning may disrupt existing well-functioning structures in workplaces. They argue that creative learning must rest on a “persistent reproduction of stable forms of practice in the workplace”.

Following a number of well-established theories of learning and innovation (e.g. Dewey 1933; Engeström 1988; Weick and Quinn 1999), it is further proposed that the learning and innovation process begins with questioning, a disturbance or the emergence of a problematic situation in the conduct of a task or in the interplay with other people. This, in turn, is expected to lead to a break from routinized patterns of thought and action, and to a search for new ways of dealing with the disturbance or the problematic situation at hand. As argued by Lam (2005), innovations may be viewed as the result of learning and knowledge creation through which new problems are defined and new knowledge is developed to solve them. In the following phase, the new knowledge and new ways of handling the problems at hand need to be effectively implemented and mastered through processes of adaptive learning in an ongoing cyclical process of adaptation and transformation (for further development of this view, see Ellström 2010a).

Thus, it is not an issue of either adaptive or creative learning, but a question of both, and where the two types of learning can be seen as extremes on a continuum of learning. Both adaptive and creative learning are needed in most organizations, as there is often a requirement to deal alternately with well-known tasks and handle new problematic situations. The challenge is one of providing opportunities for creative learning in organizations without sacrificing the necessary adaptive learning or vice versa.

42.6 Integration of Research-Based and Practice-Based Knowledge

It has increasingly been recognized that creative learning can be facilitated by purposively using research-based knowledge to challenge established ways of seeing and understanding the world (e.g. Fitzgerald and Dopson 2005). In the same vein, Svensson and Aagaard Nielsen (2006) argue that research-based knowledge makes it possible to move beyond the specific here-and-now circumstances of current work practices, and that research-based knowledge can broaden the views, provide unexpected perspectives, and show new opportunities for action. Bilson’s (2006) studies on research use in health care have demonstrated that practitioners can use research to consider their work practice in a new light, and to reflect on the underlying taken-for-granted assumptions that shape many aspects of their work. Using various forms of research can thus provide a means to release creativity, according to Bilson (2006).

The process of integrating research-based and practice-based knowledge has been understood from a constructivist perspective, that is, individuals actively construct new personal knowledge by combining different forms of knowledge.

Research-based knowledge typically goes through processes of interpretation, negotiation, debate and social influence before it is accepted and applied in practice. For instance, it has been shown that trust in respected colleagues is an important determinant of acceptance of new evidence in health care, emphasizing the socially constructed nature of evidence and other forms of research-based knowledge (Fitzgerald and Dopson 2005). Thus, before research-based knowledge leads to changes in thinking and behaviour, the newer knowledge has to be actively related to what individuals already know.

How research-based and practice-based knowledge are integrated and the outcomes of such a process have been described somewhat differently by different researchers. However, there appears to be consensus that this type of knowledge integration can lead to new knowledge and foster creative learning that in turn may contribute to the development of new innovative solutions (practice-based innovations). Desforges (2000) describes such integration as a “transformation” process, in which “old” knowledge in a particular problem context is merged with “new” knowledge. Nutley et al. (2007, p. 43) depict the process as “complex, varied, and unique” and believe the end result represents “an interaction between the ideas and findings contained in the research and the existing knowledge, experiences, and attitudes of the practitioners themselves”.

Explicit research-based knowledge can be embodied as tacit practice-based knowledge through adaptive learning (e.g. through different forms of training). An example may be a health care practitioner who participates in a course on cognitive behavioural therapy (CBT), which results in the practitioner’s use of certain CBT components when counselling patients. The integration of research-based and practice-based knowledge can also result in externalization of tacit practice-based knowledge, that is, tacit knowledge is articulated as explicit knowledge, perhaps being triggered by dialogue with colleagues (Nonaka et al. 2001). An example may be a health care practitioner who takes part in a course on Stages of Change (Prochaska and DiClemente 1983), a theory on how interventions can be matched to individuals’ motivation to change a behaviour; this kind of experience can yield improved understanding and provide concepts that make it easier for practitioners to describe and discuss with colleagues their own way of working, potentially leading to improvements in their practice.

When practitioners make their practice-based knowledge explicit, it can be shared by others and become the basis for new knowledge and learning. However, externalizing tacit practice-based knowledge can be difficult. Historically, tacit knowledge has been viewed in many professions as less important than explicit knowledge as a legitimate basis for professional work (Abbott 1988; Jensen et al. 2012). Methods that are perceived as well known, rational and logical tend to be favoured over tacit knowledge in the form of rules of thumb or intuition. Another difficulty stems from the fact that people are not always aware of the full extent of their tacit knowledge. Time raises further difficulties for sharing tacit knowledge, as the learning of this form of knowledge may take considerable time. Distance is yet another restrictive factor because face-to-face interaction is usually seen as a prerequisite for sharing tacit knowledge (Hislop 2005; Nonaka et al. 2001).

Knowledge transfer processes and issues concerning how knowledge is shared in organizations are studied in the field of knowledge management. Research in this field has moved from an objectivist perspective that focused on the codification and infrastructure to allow knowledge to be shared to a more practice-based perspective that is more concerned with how interpersonal knowledge sharing can be achieved through diverse forms of interaction and communication. The objectivist perspective assumes that knowledge can exist in a fully explicit and codified form, independent of human beings. This view is challenged by the practice-based perspective, which posits that knowledge is personal and that it is impossible to totally disembodify knowledge from people into a fully explicit form (Hislop 2005). In contrast to codification approaches to knowledge management, more recent personalization strategies focus on ways to improve the face-to-face sharing of tacit knowledge between practitioners (Hansen et al. 1999; Hunter et al. 2002).

42.7 Reflection to Foster Creative Learning

Reflection provides a mechanism for using research-based knowledge, thus providing opportunities for creative learning. The concept of reflection is generally understood as a means of translating experience into learning, by examining one's responses, beliefs and actions, to draw conclusions to enable better choices or actions in the future. The major outcome of reflection is learning, as the understanding gained is integrated into one's experience.

John Dewey's writings in the early part of the twentieth century constitute an important foundation for our understanding and use of the concept of reflection. Dewey saw the act of reflection as central to human learning and conceptualized it as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends" (Dewey 1933, p. 9). Reflection, according to Dewey, allows individuals to expose and scrutinize their habitual taken-for-granted responses to everyday life experiences. He proposed that every learning episode should be considered as one that involves a "reconstruction or reorganization of experience which adds to the meaning of experience, and which increases ability to direct the course of subsequent experience" (Dewey 1933, pp. 89–90).

Although Dewey is widely considered to be the founding father of the concept of reflection, it was Donald A. Schön who popularized the concept in 1983 with the publication of the book *The Reflective Practitioner* (Schön 1983). Schön's work was considered important for bridging "the chronically difficult vacuum that exists between theory and practice" (Redmond 2006, p. 31). Since then, many articles and books on the topic of reflection have appeared and many theorists have contributed to the development of the concept of reflection in diverse ways.

Many authors have emphasized the importance of reflection as a means of identifying and scrutinizing the assumptions that underlie one's thoughts and actions.

For instance, Boud et al. (1985) believe that reflection prepares the individual for new experiences and leads to new skills, ideas, mental models and mind sets. Similarly, Mezirow (1991) argues that the process leads to a new interpretation involving a change in the individual's meaning schemes or a transformation of meaning perspectives. Seibert and Daudelin (1999) also imply that a change in thinking occurs as part of the reflective process. Brookfield (1990) emphasizes reflection as a means to identify and question actions, habitual behaviours and assumptions that sustain attitudes and beliefs.

Reflection is typically viewed as a cognitive process or activity, but some writers (e.g. Boud et al. 1985) have also pointed to the relevance of the emotions of the individual in the reflective process. Although usually described as an individual process, the concept of reflection has also been expanded to encompass more group-centred reflection in the workplace. People tend to encounter complex problems and work on projects that require contributions from and involvement by many people, which makes more contextual and social relations perspectives on reflection highly relevant from a workplace perspective (Schenkel 2006). The term productive reflection was introduced by Boud et al. (2006) to reflect the importance of more collective forms of reflection at work.

The type of learning that is generated in reflection processes depends on the depth or level of reflection. Moon (1999) describes five stages of reflection that reflect different levels of complexity of learning. "Noticing" is the acquisition of sensory data. "Making sense" involves seeking a coherency in the material that is perceived. "Making meaning" is where the new material of learning is related to that which is already known. "Working with meaning" occurs when the learner thinks things over until they generate new meaning, which Moon considers fundamental to deep learning. "Transformative learning" is the result of persistent work towards understanding, although Moon also notes that a sudden transformation of understanding is possible.

Somewhat similarly, Strampel and Oliver (2007) describe a model that distinguishes between different levels of reflection depending on the input or source of the reflective action. The lowest level of reflection in their model, "stimulated reflection", merely involves noticing that something does not quite fit. Reflection at the next level, "descriptive reflection", means that learners recall what has taken place and their reactions to the situation. "Dialogic reflection" is a re-evaluation of an experience, which involves relating and connecting new knowledge with previous knowledge, testing for internal consistency between new ideas and existing knowledge, and making the knowledge one's own. Dialogic reflection is a process of searching for meaning, coming to an understanding, and applying new knowledge. "Critical reflection" is the highest level of reflection (other theorists have used the term critical reflection to denote the examination of social and political assumptions). This level of reflection involves application of new knowledge acquired through dialogic reflection, which may include doing things differently, clarifying issues or developing new skills.

42.8 Challenges of Reflection in the Workplace

There are a number of conditions to achieving reflection in the workplace. Reflection requires the individual's active engagement. Loughran (1996) contends that reflection depends on open-mindedness, wholeheartedness and responsibility on the part of the learner. Langer (1989) similarly argues that reflection can occur only when the individual makes a conscious choice to be mindful. The latter view seems to be shared by Boud et al. (1985) and by Mezirow (1991), who state that conscious awareness and deliberate choice are prerequisites to reflection.

Workplace reflection also depends on resources and certain structural and procedural conditions. There is a need for forums that provide legitimacy for reflection and the formal opportunity to meet and discuss matters of relevance for reflection. Time is an important resource for reflection because, as Ellström (2011, p. 115) points out, it takes "time to observe, time to think, and time to exchange ideas with others". However, although time is often emphasized as a primary factor in reflection, Fenwick (2003) argues that subjective awareness of the learning opportunities encountered at work may be more important than the allocation of objective time for learning at work. These various conditions, in turn, depend on the extent to which the organizational culture fosters reflection and learning at work (Docherty et al. 2006).

The tension between time for routine activities and time for activities that involve reflection, learning and innovation has long attracted the attention of researchers who have studied learning in organizations. The challenge is to find a suitable balance between adaptive learning and measures that bring about stability, efficiency and short-term results, on the one hand, and activities that promote creative learning, innovation and long-term development and survival, on the other hand. As argued by March (1991), an obvious difficulty in establishing these priorities is that the benefits of learning activities in terms of increased innovativeness and long-term survival are both more remote in time and less reliable than the more easily calculated value of measures to boost day-to-day operations. Furthermore, decisions on allocating resources for workplace learning are highly related to prevailing views concerning management strategies and the leading actors' perceptions of possible, desirable and, for the time being, appropriate way of managing the organization (Ellström and Kock 2009).

Management interest in the creation and maintenance of learning mechanisms has been found to vary considerably, from total unawareness of the possible existence of learning and reflection in the workplace, to ranking such activities as primary means of competition (De Geus 1992; Garvin 2000; Shani and Docherty 2003). Many researchers have emphasized the importance of viewing reflection as a matter of design, not of evolution, meaning that conscious, active decisions and planned mechanisms, structures and procedures are needed to facilitate and support reflection at work; this is often not formally allotted as a clear priority on the management agenda in many organizations. At the same time, it has been suggested that the dynamic, open, and unpredictable nature of reflection processes can make

formalization difficult. For instance, Cressey et al. (2006, p. 23) warn that reflection can only be “tamed and domesticated at the risk of destroying what it can offer”. However, it is questionable whether the potential of reflection can be fully realized without formalizing reflection as an expected legitimized activity in a workplace.

In a previous study (Nilsen et al. 2012), we identified and described two examples of organized reflection activities and how such activities can provide a mechanism to integrate research-based and practice-based knowledge. This study illustrated how managers in the public sector (social work, health care and education) in Sweden deliberately drew on research-based knowledge to challenge existing practice-based knowledge regarding everyday situations and problems encountered in the workplace, thus triggering creative learning. In one of the cases, the purpose of the reflection activities was to facilitate managers’ learning to improve handling of everyday decision making in situations they considered particularly challenging or difficult. The reflection activities were organized as reflection groups that met on a regular basis (e.g. once a month). Each reflection group was supervised by a facilitator whose task was to observe, provide a structure for the meetings and actively contribute to the discussions with theoretically based knowledge and experience in the areas of leadership and organizational development. The facilitator used challenging questions to make the participants examine their assumptions or opinions and discuss alternative ways of viewing the issues. The topics were derived from the participants’ real-life situations and dilemmas encountered in the workplace, including issues such as workload, problem solving in everyday work, feedback from managers and colleagues, conflicts among the staff, goal clarity and the execution of leadership in the workplace.

42.9 Summary and Conclusion

This chapter defines the concepts of innovation and practice-based innovation and describes some key characteristics of practice-based knowledge and research-based knowledge and how these two types of knowledge can be integrated to facilitate creative learning and practice-based innovation. Reflection in the workplace is proposed as a mechanism by which such integration can take place. Although research provides strong arguments in favour of reflection, empirical research has described many challenges to reflection in the workplace. Reflection does not automatically yield creative learning. The reflection level models of Moon (1999) and Strampel and Oliver (2007) suggest that creative learning is only possible if reflection is sufficiently advanced.

It is further argued that creative learning can be facilitated by deliberately drawing on concepts, theories, models and empirical findings of research to achieve deeper, more advanced reflection. However, the notion of using research-based knowledge to improve practice is far from novel. The importance of research-based knowledge is central to the evidence-based practice agenda, which assumes that the rational and systematic application of research findings can yield more effective and

accountable practice. Evidence-based practice is seen as a response to growing demands in many fields that professional practice should be underpinned by scientific knowledge and evidence on the effectiveness of various practices (Trinder 2006). Evidence-based practice has been described in terms of prescribing methods and routines to reduce variations in different practice contexts, thus making practice more standardized, codified and transparent (Dopson et al. 2005). Evidence-based practice implies that professionals engage in predominantly adaptive learning. The focus is very much on the implementation of and adherence to a particular best practice. In contrast, this chapter emphasizes the potential importance of using research-based knowledge to challenge established patterns of thought and action. Creative learning involves experimentation and testing of alternative ways of acting in different situations, activities that seem far removed from the ideals of evidence-based practice.

However, there are many challenges for future research in this field: studies of the extent to which reflection that specifically draws on research-based knowledge occurs in various practice contexts; how such reflection can be organized; barriers and facilitators for the implementation of reflection at work; the extent to which reflection is part of the management agenda; and how resources and other conditions that foster reflection are prioritized in different organizations. The increased emphasis on evidence-based practice in many practice contexts underscores the importance of conducting research on the degree to which an evidence-based practice provides opportunities for creative learning and practice-based innovation. The issues are manifold and complex, but they need to be addressed for better understanding of how the potential of integrating practice-based and research-based knowledge through reflection in the workplace can be realized.

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Chapter 43

Technology-Enhanced Professional Learning

Allison Littlejohn and Anoush Margaryan

Abstract Societal and technological changes are transforming the ways people work and learn. As work roles evolve, learning for work becomes continual and personalised. These transformations evidenced in work and learning practices are partly governed by advances in technology. Consideration of work practices, professional learning processes and technologies mediating work and learning within a single domain of ‘Technology-enhanced Professional Learning’ enables analysis of the dialectical relationship between technology and practice. This chapter begins by presenting a single framework that integrates perspectives across the domains of work practices, learning processes and digital technologies. Key trends are outlined from the literature within each domain. Using a framework for TEPL as an analytical lens, emerging work and technology practices and their implications for professional learning both in and for work are examined. Finally, the chapter outlines the implications of these developments for work and learning.

Keywords Technology-enhanced learning • Professional learning • E-learning • Work-based learning • Workplace learning

43.1 Macro-level Trends Impacting on Work and Learning

Societal and technological changes are transforming the ways people work and learn. Society is facing complex problems on a global scale (Castells 1997). Issues such as our growing requirements for energy, our need for improved healthcare and the effects of global warming require deep, specialist knowledge to find solutions.

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The knowledge required to solve each problem is progressively distributed across a number of people in specialist roles, rather than within a single job function. People increasingly work together in agile groups that form, collaborate then disperse and reform as new projects and tasks arise (Sloep 2009; Sloep and Berlanga 2011). These new and dynamic forms of organisation result in shifting social relationships at work, with systemic, new work practices evolving continually to accommodate these transformations (Bietz 2013). These changes impact on the way labour is divided, as people with deep expertise collaborate around shared work problems in new forms of organisation. These trends – changes in work patterns, increased collaboration and new forms of organisation – are impacting on the ways people work and learn.

The transformations evidenced at work are partly brought about by advances in technology. Many contemporary work practices are mediated by technologies (Engeström 2009). Some practices capitalise on the automation of tasks that are repetitive or complex and require computation. Others exploit technologies to enable people to collaborate in radically new ways (Nickerson 2013). For example, in many places around the world it is now routine for people to collaborate across conventional geographic, disciplinary, organisational, and sectoral boundaries (Bietz et al. 2010). As individuals collaborate remotely, they no longer rely on a single organisation to employ them. Increasing numbers of people are employed by more than one organisation or are self-employed, working in parallel across different roles (Beck 2000). Power increasingly shifts from organisations towards individuals taking responsibility for their own work and, by extension, their professional learning, to enable them to function productively within new workplace configurations. Therefore, the co-evolution of work, learning and technology is having a profound effect on society and on work. However, it is yet to have a significant impact on professional learning.

Conventional forms of professional learning, such as formal training, allow large numbers of people to reach a specific level of competency. However, these forms of learning are unlikely to meet the learning needs of professionals in contemporary work contexts (Collin et al. 2012). The reason is because although learning a standard curriculum may be helpful for some (limited) work tasks, perpetual change at work means that set curricula are no longer an effective means of professional learning (Väljataga and Fiedler 2013). Professional learning should be reconceptualised to capitalise on new forms of organisation, different feedback formats and the numerous ways people and the resources they require for their learning and work can be brought together (Littlejohn and Margaryan 2013). Therefore a fundamental rethink of how professional learning aligns with these emergent trajectories in work, technology and society is required. Professional learning is ongoing: as people deal with constant changes in employment and work practices, they need to learn new knowledge to solve the new problems they face at work (Hager 2004; Felstead et al. 2009; Hadwin et al. 2011; Illeris 2011). Professional learning should be personalised: as work becomes more specialised, each individual's learning needs are bespoke, influenced by environmental (job role, tasks, culture) and intrapersonal factors (previous knowledge, skills, attitudes).

One way forward in advancing professional learning is to reconceptualise it as a function of three key integrated dimensions – work practices, learning processes

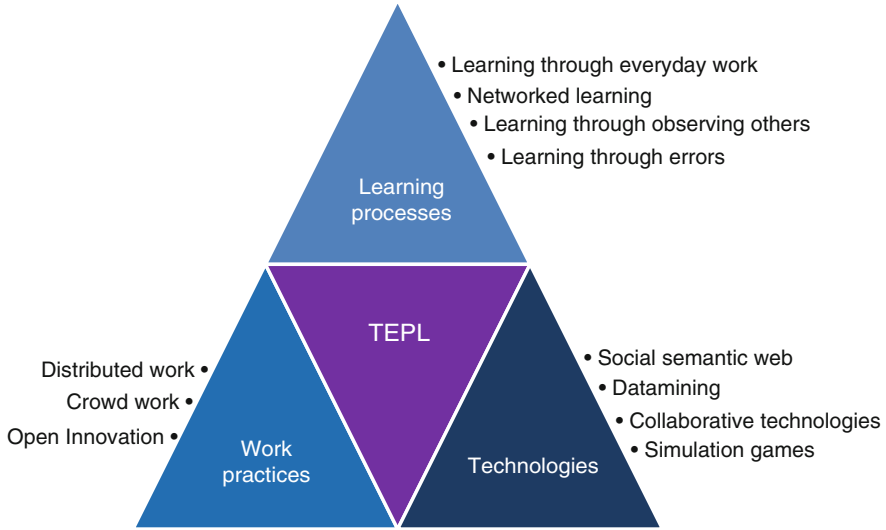


Fig. 43.1 Technology-enhanced professional learning: work practices, learning processes and technologies

underpinning work practices and technologies mediating work and learning – within the single domain of ‘Technology-enhanced Professional Learning’ (TePL) (Fig. 43.1). This integrated conceptualisation is necessary, since the development of new technologies is not significantly driven by the understanding of learning processes or work practices. There is a dialectical relationship between technology and practice. This integrated perspective therefore emphasises the need to consider work practices and learning processes in technology development; emerging forms of work and learning should influence technological developments, just as technological developments influence work and learning.

TePL is positioned here as a phenomenon representing current practice in knowledge work, how people learn through everyday work and how technology supports these activities. It is intended as a framework to conceptualise what is happening in knowledge-intensive workplaces, rather than an ‘approach’, a ‘method’ or a ‘thing to be integrated’. Within each of these three dimensions there are a number of themes and approaches that are gaining prominence in the literature. The purpose of this chapter is to explore these critical areas and examine their impact on technology-enhanced professional learning. Many of the concepts outlined in this chapter are primarily applicable to knowledge workers, since this group of employees tend to use digital technologies as a focal point for their work. However, these concepts are applicable to any type of work where digital technology tools are central to carrying out that work. The chapter concludes by examining the trends and practical possibilities around technology-enhanced professional learning.

43.2 Dimensions of Technology-Enhanced Professional Learning

43.2.1 Work Practices

Work practices have been changed by digital technologies. One of the most significant changes is that people can work remotely via networked technology. Essentially, work is no longer tied to a specific workplace and can take place remotely from almost any location where a network connection is available (Bietz et al. 2010). There has been a dramatic increase in *distributed work* where networked technologies are used to assemble dispersed groups of people within and across organisations to collaborate (Bietz et al. 2010; Ashton 2004). A specific form of distributed work is *crowd work*, whereby large numbers of people outside organisational boundaries are brought together to work on specific tasks (Nickerson et al. 2009). *Open innovation* is another form of work that allows organisations to update their products rapidly and effectively (Chesbrough 2003). This section analyses these three examples of work practices in detail to draw out key trends and factors.

Networked technology tools are becoming ubiquitous in many parts of the world. Technology allows distributed groups of people to work together almost seamlessly, even though they may never have met face-to-face. One advantage of distributed work for organisations is that work can be co-ordinated flexibly (Bietz 2013). People from diverse domains can be assigned to projects depending on their specific expertise. Tasks can be redistributed across different sets of people located in different parts of the organisation. Organisations can capitalise on the knowledge and skills of people no matter where they are located. However, in distributed work all interactions have to be mediated by technology. The ways people relate to one another differs from the sorts of relationships within established forms of work (Bietz et al. 2010). Distributed employees tend to work in loosely-connected, fluid and agile groups compared with more stable, strongly-tied groups of people working face-to-face. Sometimes people find it more difficult to bond and form a shared identity than in co-located settings. Shared identity is particularly problematic when group composition is changed frequently, for example when new projects are commissioned and work tasks transform. Even different patterns of distribution of people can impact on work practice and performance. For example teams with members working face-to-face and others working at a distance may experience effects related to shared identity: people working face-to-face may share identity, while co-workers at a distance may feel excluded (Vaida et al. 2012). Professionals working in distributed settings, therefore, may potentially face a mis-match within the group and reduced collaborative performance (Bos et al. 2006). The impact of technology on distributed work practice allows work to be divided in new ways and enables new forms of collaboration. However, distributed work disrupts conventional relationships so when people work at a distance their

relationships change. The effects of distance and diversity on work relationships and productivity are complex and, therefore, the consequences of the distribution of work are not well understood (Bietz 2013).

Crowd work is similar to distributed work in that it involves large numbers of dispersed people connecting via networked technology to perform a set of work tasks (Kittur et al. 2013). A key difference between distributed work and crowd work is in the ways in which people connect. In distributed work, individuals are brought together as teams to work on a specific problem. Crowd work, on the other hand, involves outsourcing discrete tasks to large numbers of disconnected individuals (crowds) (Nickerson et al. 2009). Crowd workers perform many thousands of tasks during a year and they often choose to work on specific tasks they are good at. The relationships – including learning relationships – of crowd workers to their co-workers is different from the usual sorts of associations of employees in established organisations (Nickerson 2013). In conventional workplaces, people have the opportunity to learn from more experienced colleagues. Crowd workers generally have no knowledge of other people working in parallel on similar tasks. Crowd work is organised through online platforms that assign people specific tasks, for example the Mechanical Turk platform (<https://www.mturk.com>). Typically an employer sends out a request for work through this type of crowd work platform. Crowd work tasks are usually short or repetitive. Large numbers of people browse lists of these tasks and select those they want to work on. Each crowd worker is paid per task, rather than hired as a full-time or part-time employee. When a task has been completed, the crowd worker is free to select another task – possibly from a different employer – or decide not to continue working. Therefore, crowd work not only changes relationships amongst co-workers, but it radically transforms what we understand as work and how we view the workplace (*ibid*).

Open innovation is another process that involves changing relationships. Through open innovation people within organisations connect with others outside the company to source ideas to improve their products (Chesbrough 2003). Broadly, there are two types of open innovation: the so-called ‘outside-in’ and ‘inside-out’ open innovation. In the ‘outside-in’ version, organisations reach out to external people (typically researchers, customers) to bring new ideas into product design and manufacture. At the opposite end of the scale, the ‘inside-out’ approach is where organisations take new ideas to the market and sell Intellectual Property. One example is Ideagora, Internet-based platforms where people and organisations come together to exchange ideas or seek out new markets for products or applications (Tapscott and Williams 2007). The process brings together diverse groups of people to work on a single problem – for example, designers, researchers, manufacturers, customers, venture capitalists and government agencies. Similar to people who are involved in distributed work and crowd work, their relationships with each other and with the organisation are fluid. They are bound together by a common goal, even though they have diverse motivations. Their capacity to work together is related to their ability to exchange and acquire knowledge through professional learning.

43.2.2 *Learning Processes*

Changes in work practices bring about opportunities for new forms of professional learning (Ericsson 2009; Ericsson et al. 2006; Hagar 2011). Contemporary professional learning processes are described in the literature, some notable examples being *learning through everyday work*, *learning through observing others*, *learning through networks* and *learning from errors*. Trends related to learning processes have been noted in the literature. Analogous to the trends in work processes, changes in learning processes are connected with the ways people inter-relate and how they associate with their workplace (Billett 2001; Edwards 2010; Eraut 2002; Lee et al. 2004).

A great deal of continual professional learning takes place on the job, *through everyday work* activities and through 'being proactive in seeking out learning opportunities' (Eraut and Hirsh 2010, p. 30). Conventional formal learning, such as classroom-based training, is usually recognised by employees as 'learning'. However, on-the-job learning tends to be intertwined with work to such a degree that it is difficult to distinguish from normal work activities (Littlejohn et al. 2009). On-the-job learning is unstructured, incidental, difficult to standardise and complex to evaluate and assess. An example of on-the-job learning is a product design engineer working with a large engineering company in a multi-disciplinary project based team where she is the expert from her specific discipline (Littlejohn et al. 2012). Through her daily work she learns about new materials available on the market and the value they bring to her product designs. A large proportion of her time is spent accessing and interpreting existing knowledge held within and outside her company, as well as working in project teams to create new knowledge in the form of design specifications and research reports. Her on-the-job learning involves setting learning goals aligned with her work tasks. She learns through collaborating with others, drawing on her professional and personal networks: co-workers, contractors, professional contacts in external organisations as well as family and friends. It is almost impossible to distinguish her learning from her work. At the same time, through working with other people, she (explicitly or implicitly) supports other people's learning, through sharing her knowledge, fluidly shifting her role back and forth from learner to instructor. Technology systems are already on-stream to enable people to exploit these sorts of learning opportunities. These systems allow people to structure their on-the-job learning around their daily work tasks, linking to and learning with colleagues who share similar tasks and goals. However, to capitalise on the full potential of on-the-job learning, people have to recognise and purposefully plan, instantiate and reflect on how and what they learn in their daily work (Milligan et al. 2013). Exploiting these opportunities for professional learning requires a shift in cultural perceptions of where and how professional learning takes place, how learning is assessed and how learner-instructor roles are perceived.

Technology-enhanced, on-the-job learning is particularly useful in contexts where people's roles are fluid and constantly changing and where learning has to be personalised for each individual. Each person has a unique job role, so the learner (rather than an instructor) can understand where and how to develop deep expertise

(Engeström 2004, 2009). Technology systems can help source and use relevant knowledge across disciplinary or organisational frontiers in ways that allow individual learners to build new knowledge (Littlejohn et al. 2012). Digital networks provide dynamic environments that connect work and learning through the collaboration around ‘objects of inquiry’, or resources that people collaborate on while working and learning (Paavola and Hakkarainen 2005; Paavola et al. 2004). Therefore a key trajectory in professional learning is that learning is largely directed and mediated by individuals themselves.

One way individuals can direct and mediate their learning is by *observing other people*. An example of this sort of learning is mimetic learning: learning by observing and imitating others who have greater expertise (Billett 2013). Mimetic learning complements people’s direct interpersonal interactions with others, including direct instruction and mentoring. While observing others, learners can gather relevant information on their own performance by noting the outcomes of and reactions to their actions (Boshuizen and Van de Wiel 2013). People can ask colleagues who are more experienced for feedback on how to improve their performance (Ashford et al. 2003). This form of learning is feasible only in environments where feedback-seeking behaviour is encouraged. Technology systems are being developed to provide feedback through intelligent systems that can analyse an individual’s actions and compare it with expert performance (Negnevitsky 2005). However, systems that exploit artificial intelligence to enhance professional learning are relatively immature (Berendt et al. 2013). Social technologies allow professionals opportunities to learn through observation of the choices and actions experts make when going about their everyday work (Sie et al. 2013). For example, social bookmarking is a process where people record and tag resources they source online. These resources and tags can be shared with others. Employees can browse the resources and tags collected by other people with greater expertise. Other examples of social technologies are blogs and microblogs (such as Twitter or Yammer), which are useful tools for knowledge sharing and professional learning (Java et al. 2007; Margaryan et al. 2014). With the advent of the social semantic web, self-guided, online social learning is becoming a more genuine and attractive option for professionals, particularly in situations where continual informal learning is interspersed with specific cases of formal learning (Sloep 2013). However, effective use of the tools requires a level of digital competence that professionals in some disciplinary fields may not yet have (Littlejohn et al. 2012).

Another modern-day learning process that requires digital competence is *learning through networks*. Networked, self-regulated, social learning is becoming more realistic and attractive as professional learning moves from prominently formal towards continual informal learning interspersed with specific formal learning. Individuals learning through networks connect with other people and resources, forming transient networks and communities (Sloep 2009; Pataraiia et al. 2014). Groups of learners transcend geographical, organisational and disciplinary boundaries, connecting people with others who are working, learning and creating new knowledge around a common problem. Learning – and working – through networks has

similarities to the distributed learning and crowd work settings, offering opportunities for new forms of professional learning. Professionals tap into these professional networks to find the knowledge and expertise they require to learn how to solve specific work problems (Nardi et al. 2000). Individual learners benefit from the knowledge and expertise of others, drawing on professional networks and supported by networked technologies. Peer support is a critical factor in networked learning, particularly where peer recommender tools and trust-enhancing profile systems are being developed to support co-work within virtual teams (Sloep 2013; Ley et al. 2013). However, networked learning approaches encourage individuals to link with other people outside their immediate groups. For example, an investment banker designing a system to lessen financial risks in his company reads a blog from a safety scientist who has implemented a mechanism to reduce incidents in hazardous workplaces. Although the context of application is different, the key principles fit with the banker's work task. He amends and implements these principles, contacting the safety expert for advice.

A further example of networked learning is where people collaborate around a shared problem. For example engineers working on a bridge design will bring knowledge together from different disciplinary domains into a single project, building knowledge and ideas via a network. In this case, the design is an 'object' that connects professionals who are working and learning together (Knorr-Cetina 2001). The idea of social objects and objectual practice is not new and has been studied extensively within the context of science research (*ibid*). While advances in the Social Semantic Web and network technologies will open up opportunities for networked professional learning, capitalising on the affordances of these tools requires a cultural shift in how professionals view learning.

An approach to learning that has been gaining importance in organisational contexts is *learning from errors* (Ohlsson 1996). Learning from errors is significant in hazardous work environments including the energy sector or aviation industry (Bauer and Harteis 2012). This approach to learning is based on the assumption that the collective knowledge residing within individuals in a workplace can be translated into organisational learning and behavioural change in people's work practice. Learning from errors is closely related to learning from incidents, where individual employees and organisations as a whole seek to understand and learn from past safety incidents to avert future problems (Lukic et al. 2010). The central idea underpinning learning from errors and learning from incidents is that individual and group knowledge is translated into organisational learning by which, in both approaches, problems are analysed to abstract knowledge. This knowledge can be accumulated and embedded within the work environment in ways that can generate changes in professional practice and prevent future incidents. As with the other learning processes described in this section, employees' active engagement in the learning process is essential for effective learning (Lukic et al. 2012).

All the approaches to learning described in the section provide opportunities for professional learning to evolve into forms of learning that are helpful for contemporary work. However, what is clear from all these examples is that technology solutions have to fit with new work and learning processes.

43.2.3 Technologies

Earlier in this chapter we outlined the trend towards collaborative and dispersed work. Ideally technology tools for professional work and learning should allow for collaboration by dispersed groups of people (Ley et al. 2008). Two general examples are *Collaborative Technologies* and the *Social Semantic Web*. These examples have been selected as examples of technologies that impact technology-enhanced professional learning because they already are being integrated into a wide range of work contexts. Another example of how work is being impacted by digital technologies is through *datamining*, which provides new knowledge that can aid learning and work (Berendt et al. 2012). A further significant use of technologies for professional learning is the use of technology environments to simulate authentic environments for learning. One interesting example is the use of *simulation games* to provide realistic learning activities representing work tasks. Providing learning activities that simulate real-world work situations and offer an opportunity for individuals to experiment and ‘fail’ in a safe environment can motivate people to engage in professional learning.

Digital technologies allow data to be ‘captured’ and ‘mined’. These data may take various forms, for example the data may be available as ‘knowledge resources’ (objects) or as learner behaviours (patterns) (Berendt et al. 2012). These data can be analysed to provide new insights for learning and work. *Datamining* and analytics to support learning are relatively undeveloped. One example of datamining for learning is learning analytics, which measures and analyses people’s behaviours to provide feedback and recommend actions for learning and expertise development. However, learning analytics systems are being developed in ways that support conventional, formal learning from pre-determined curricula, missing the wider range of opportunities around professional learning.

There are a wide range of ubiquitous *collaborative technologies* in daily use, including email, content management platforms, shared document repositories, audio or video-conferencing, and many more. Social media introduces further tools for knowledge-sharing, including wikis, weblogs, microblogging services, collaborative publishing and annotating, media sharing and social bookmarking. These tools support social knowledge construction and knowledge-sharing activities on the individual and organisational level. This functionality allows individual learning and knowledge to be available for organisations or collectives (Bernardi et al. 2011; Ley et al. 2013).

The *social semantic web (SSW)* supports learning in work environments by providing a platform for the creation and sharing of user-generated knowledge (Breslin et al. 2009; Bingham and Conner 2010; Vassileva 2008). Employees increasingly use their own social software, rather than enterprise technologies, for work and learning. Consequently their collective knowledge becomes distributed across different social technology tools and spaces. Semantic Web technologies provide a means by which people can structure and integrate their knowledge. This knowledge extends beyond artefacts and resources created by employees to

include online traces of employees' online activities dispersed across various tools. These traces can be turned into relevant, contextualised information within the workplace (Jeremić et al. 2013). SSW allows common formats for the exchange of information about knowledge resources (Jovanović et al. 2009; Mikroyannidis 2007). In this way the SSW offers opportunities for 'bottom up' use of technologies by employees as they regulate their professional learning (Siadaty et al. 2013).

Digital technology can also simulate authentic environments for professional learning. An example is *simulation gaming* to provide realistic learning activities that simulate real-world work situations and offer an opportunity for individuals to experiment and 'fail' in a safe environment or experimentation may be hazardous or dangerous for the learner or for other people. Sometimes termed 'serious games', 'business games', 'management games' (Faria 2001; Faria et al. 2009) or 'policy games' (Mayer 2010), simulation games offer realistic learning opportunities that are useful particularly in situations where learning or experimentation may be hazardous or dangerous for the learner or for other people. These types of games combine characteristics of 'pure simulation' (abstract models that represent and reconstruct work processes) and underlying reference systems (such as authentic work situations), with key elements of games that simulate social dynamics (Kriz 2003). Examples include learning situations for surgeons and other medical professionals, where trialling different forms of practice could be dangerous for patients (Lukosch et al. 2013) or for energy sector employees, where experimentation could result in a major incident. Alternatively, simulation games can visualise materials that cannot be seen. For example chemists can experiment with molecules at the atomic level. Simulation games support situated and authentic learning by providing an environment in which players can relate their actions (within the game) to their work activities (Yusoff et al. 2009). Simulation games can be implemented in workplace settings in ways that allow two-way interaction between the game (simulating a real-world work environment) and the work environment itself (Klabbers 2006). Therefore the games can be used to provide insights into work processes, supporting decision making and enabling participation within real organisations. In this way the games are not only useful for learning, but can also be used to analyse and improve organisational systems (*ibid*).

Simulation games have key elements that differentiate them from 'pure simulations' such as flight simulators used in aviation training, which do not include these sorts of game mechanics. Key elements of games include game principles (for example, rules), game mechanics (including scoring), and gaming means (for example, competition). Game principles are generally guided by 'rules' that are typically pre-defined. These rules define the game space and govern the actions of the players (Klabbers 2006). Game mechanics are usually administered by a 'scoring system'. Scoring allows each player to assess his or her performance, thereby increasing their engagement in the game. Scoring is related to the element of competition, which is widely used to engage players in the game process. Competition compares the knowledge and/or skill of one player with the skills of others playing within a single game environment. Other important game elements include 'reality', 'meaning', and 'play' (Harteveld 2011). 'Reality' describes how a game models the real world;

‘meaning’ is related to the value the game adds to the player’s ability to perform in real world situations; and ‘play’ is the player’s immersion in an interactive, fictitious scenario. All three elements – reality, meaning and play – are important for simulation game design since they have the potential to increase player motivation, engagement and immersion (Harteveld 2011).

In the next section we consider the trends outlined in this section and examine their implications for professional learning.

43.3 Trends and Implications for Professional Learning

From the analysis in the previous section, three key facets of professional learning appear to be critical:

First, in a constantly-changing and knowledge-driven society professional learning has to be *continual* (Eraut 2004; Hager 2004; Siadaty et al. 2013). Yet current forms of professional training largely focus on large cohorts of people learning general concepts at the same time, rather than on individuals continually learning knowledge that is specific to their work activities.

Second, as job roles become unique to each worker, individuals have to take responsibility for *self-regulating* their own learning, rather than relying on guidance from an instructor (Littlejohn et al. 2012; Margaryan et al. 2013). The more personalised job roles become, the more critical it is that learning is designed to support each individual to learn what they need (Tynjälä 2009; Engeström 2013). Yet, professional learning often is predicated on people having generic, rather than specific, job roles (Fiedler 2013). In fact, much of the learning that goes on in the workplace is largely informal and social and goes unrecognised (Colley et al. 2002; Hart 2010; Tynjälä 2008).

Third, as employment and work practices change, work *relationships transform*. As the focus of work shifts from tasks within a single organisation to distributed work within the network, people coalesce around ‘epistemic objects’ (knowledge objects such as a report or an output from a shared task), rather than group, team or organisational structures. These transformations impact relationships amongst employees as well as the relationships of people and organisations (Nickerson 2013; Bietz 2013). Current professional training tends to be designed around conventional forms of employment, missing fresh opportunities for learning.

These three facets of professional learning are examined in detail in this section.

43.3.1 *Continual Professional Learning*

Continual professional learning is important for both organisations and for individual workers (Clow 2013). Organisations benefit from continual learning that enables employees to solve more complex problems or deal with new

tasks efficiently (Clow 2012). For individuals, continual learning expands their skills and competencies in ways that allows them to adapt to changing work situations, thus extending their employability. The capability of an individual to continue to be employable under conditions of considerable change has been termed career adaptability (Brown et al. 2012). Career adaptability is an aspect of the self-regulation of an individual in response to the need to adapt to disequilibrium caused by changes in job roles, work tasks and so on (Savickas 2005). Adaptability extends beyond employability in recognising that work practices never reach equilibrium, and are continually evolving in response to workplace transformations (*ibid*). Although the concept of career adaptability has psychological roots, it is influenced by psycho-social factors such as guidance from others (Brown et al. 2012).

Guidance and feedback, task planning and reflection on outcomes have been characterised as important elements of non-formal, workplace learning (Eraut 2002; Kyndt et al. 2009). These activities are achieved through regularly interacting with colleagues, evaluating progress, self-evaluation or feedback from others (Dunn and Shriner 1999; Sonnentag and Kleine 2000; Van de Wiel et al. 2004, 2011a, b). Often the interactions between individuals are informal and serendipitous. Nevertheless, these connections could form a basis for professional learning activity (Siemens 2005), providing opportunities for feedback – from peers, experts and from computer systems.

Organisations have been seeking to capitalise on individuals' knowledge in ways that benefit the collective (Nonaka et al. 1998; Lewis et al. 2007). Some organisations have implemented performance management practices and systems to encourage employees to engage in continual learning by integrating learning and performance improvement goals within their work (Ericsson 2009; Luthans and Peterson 2003). These organisational processes support professionals in managing and advancing their own learning, and are often administered via networked technology systems (Davenport 2005; Davenport and Pruzak 2000). However, despite the promise of these technologies, many performance management systems are limited in their design. Some systems are used as a repository, storing examples of individual's work, learning resources and qualifications. Other systems are linked to enterprise tools, limiting the social networks employees can utilize, restricting knowledge flow across the network, and limiting the cross-application of data.

Technology systems are most effective in supporting professional learning when they support social activities. Examples of these sorts of activities include coaching or feedback from experts or more knowledgeable peers (Kicken et al. 2009). There are a range of data routinely generated through work activities that can be used to support these sorts of activities (Siadaty et al. 2013). Data on work tasks, priorities, goals, connections and employee behaviours can be collected, analysed and used to support professional learning (*ibid*). Some systems gather the data available about the user to enable the system to 'adapt' to individual learners' preferences and characteristics and support continual learning (Shute and Towle 2003).

One example of an adaptive system is APOSDLE (<http://www.aposdle.tugraz.at/>): a suite of tools and services designed to support individuals with formal and non-formal

work-related learning (Lindstaedt et al. 2009). System development was funded under the European Commission's 6th Framework Programme. APOSDLE is an example of a social, semantic network-based system that connects employees within an organisation by comparing the textual and semantic similarity of their work and learning activities (Beham et al. 2010). A User Profile Service stores and maintains user data about current work tasks, work domain and learning goals as well as the individual's learning history. The system uses semantic models (based on each individual's work task, work domain and learning goals) to recommend learning paths and to identify other users with similar paths or who have achieved similar goals (Ley et al. 2008). These sorts of social, semantic systems provide a platform for continual learning largely through the collaborative creation and sharing of user-generated knowledge (Berlanga et al. 2007, 2008; Brouns et al. 2007; Bingham and Conner 2010; Vassileva 2008). Professionals use the platform as a focal point to continually plan their learning, integrating non-formal on-the-job learning with formal training as appropriate.

These technology systems provide a useful platform for continual professional learning, however underlying problems have been identified. Adaptive systems have the potential to support professional learning through the creation of multidisciplinary knowledge across geographic, organisational and disciplinary boundaries (Ley et al. 2013). In this way they seem ideally suited to contemporary workplaces where roles are specialised and autonomous. However, these adaptive technology tools tend to draw data from enterprise systems that are linked to organisational structures, providing a 'top-down' interface. On the one hand this interface provides a 'top-down' structure that can guide learning (Sloep 2013). However, this structure constrains the learner's autonomy as to how and where to develop deep expertise. This autonomy is critical for contemporary professional learning and development (Engeström 2009) so systems designers have to find ways to collect social, semantic data beyond organisational, disciplinary and geographic boundaries. There are examples where access across boundaries has been achieved, for example in the Open Source Software domain, development of the Linux operating system and Apache web server involved the integration of data across boundaries (Weber 2004). Similarly, the ATLAS project at CERN, which aimed to find evidence for the existence of Higgs boson, set up an open system for data exchange (Boisot et al. 2011). Despite these examples, the problem of accessing and collecting distributed data is difficult to resolve, since it would require agreements to share data across commercial sites and international alignment of privacy laws (Sloep 2013).

Adaptive systems can help source and use relevant knowledge in ways that allow individual learners to build new knowledge (Littlejohn et al. 2012). These systems are designed to meet individual's work and learning needs, with the recognition that each learner's needs are different. However, the effectiveness of the tools depends on the willingness of professionals to work across boundaries and their ability to operate across cultures. Equally, it is dependent on the motivation and aptitude of individuals to self-regulate their learning (Van de Wiel et al. 2004; Zimmerman 2002).

43.3.2 Self-Regulated Professional Learning

Workplace learning is structured by and deeply integrated with work tasks (Billett 2001). As professionals specialise in their roles, learning becomes unique to each individual (Engeström 2013). Where expertise becomes deep and narrow, each individual worker cannot rely on formal training designed to transmit generic knowledge to groups of people with similar roles (Stenstroem and Tynjälä 2009; Fiedler 2013). Specialists have to be capable of identifying their own learning needs, which can be fluid depending on changing circumstances. They must cultivate an understanding of where and how it is appropriate to develop deep expertise (Engeström 2004; Carneiro et al. 2007). Each individual has to be capable of drawing on the knowledge available to her (resources and the know-how of other people), making decisions about what to learn, when and how (Siadaty et al. 2010). This process has been termed “self-regulated learning”.

Self-regulated learning can be defined as “self-generated thoughts, feelings and actions that are planned and cyclically adapted to the attainment of personal learning goals” (Zimmermann 2002). Social-cognitive theories of self-regulated learning (Pintrich 2000; Zimmerman and Schunk 1989; Winne 2010) posit that the regulation of learning is social. Each individual ideally can plan and structure their own learning, through goal-setting, self-monitoring and self-reflection (Zimmerman 2002). In formal learning contexts these stages occur consecutively, however, in the social professional learning situations, these self-regulatory processes are much less clearly delineated and much more closely interwoven with everyday work tasks (Margaryan et al. 2013).

Through regulating their own learning, professionals can solve everyday work problems, and develop a range of competencies that enables them to attain career adaptability, as outlined in the previous section (Brown et al. 2012). Organisations can support employees’ learning by identifying individuals’ self-regulation ability, encouraging and supporting them to improve (Fontana et al. in press). Similarly, by understanding their capacity for self-regulation, professionals themselves can improve their ability to take forward their own learning.

Self-regulation is based around “attaining and maintaining goals, where goals are internally represented desired states” (Vancouver and Day 2005). Even though learning goals are centred around individual people, goal setting and attainment takes place at the intersection of the individual and the collective (Littlejohn et al. 2012). Learning and development goals tend to be associated with work tasks and are often shared by individuals engaged in collaborative work. However, the role of the collective in self-regulated learning, particularly professional learning, is not well understood.

Some attempts to improve professionals’ self-regulation have focused on the use of digital networks to provide a point of connection for individual learners with the broader collective. Networks are important in situations where practice is distributed and where people work in transient groups (Sloep 2009). In these contexts, the conventional forces that bring people together, such as geographic location or team affinity, lose their binding force (Jensen and Lahn 2005) and have to

be reinvented. Here, people tend to work around shared epistemic objects – knowledge resources that people collaborate around while working and learning (Knorr Cetina 1997, 1999; Paavola and Hakkarainen 2005; Paavola et al. 2004). An example of an epistemic object is an electronic patient journal that is used as a focal point for health professionals from a variety of disciplines to collaborate around, sharing and building knowledge about the patient (Bruni 2005). These objects provide the focal point and structuring resources for the construction of new professional practices (Lahn 2011). These objects can be viewed as products (the instantiation of professional knowledge) and processes that reshape professional practices (Hakkarainen et al. 2004). For example, these objects provide a mechanism for professionals to integrate knowledge from diverse domains, rather than limiting themselves to specific knowledge domains (Lahn 2011). Bringing knowledge together from across different boundaries is critical when planning effective professional learning.

One example of a learning and development planning tool that aims to support professionals in drawing upon knowledge from across diverse domains is SRL@Work. To connect knowledge across domain boundaries in an effective way, professionals have to align their own learning goals with the learning goals and activities of their colleagues, and of the organisation (Siadaty et al. 2013). It is difficult and time consuming for professionals to make these alignments themselves, so the network system recommends connections by using pre-defined ontologies to link and integrate user traces within the network. Data is collected about specific learning activities, tools and prior knowledge that users have (Siadaty et al. 2011). The system uses these ontologies to identify gaps in learners' competences. The system monitors learning progress and recommends learning strategies to users, sharing and documenting their learning experiences and comparing self-observed performance against peer performance (Siadaty et al. 2012).

SRL@Work provides a system that potentially aids professionals to improve their ability to self-regulate their learning. However, these sorts of systems are still experimental and have significant constraints. SRL@Work uses both social and organisational workplace factors to support self-regulation. The social factors allow individuals to plan their learning goals in relation to the goals of other people, drawing on collective knowledge. These social factors help to make previously unforeseen and unanticipated connections (of people or knowledge) across boundaries. However, the evaluation results indicate that, although users see value in these social factors, they place greater importance on organisational factors when planning their goals (Siadaty 2013). This limitation was evidenced in earlier career management tools that steer the individual into updating his or her skills in relation to organisational working conditions, rather than focusing on broader career patterns and trajectories (Brown et al. 2012).

Another problem is that professional communities tend to be defined by their knowledge domain and characterised by “epistemification” or the ways in which different professions view knowledge (Stutt and Motta 1998). This form of cultural identity limits professionals when they plan their own learning trajectories, restraining the potential diversity and multidimensionality of learning processes (Lahn 2011).

Changes in work practices mean that boundaries are no longer clear. Therefore the relationships amongst people and between individuals and organisations are changing.

43.3.3 Transformed Relationships

Informal learning tends to involve interacting with other people. Therefore, as informal learning becomes increasingly important for work, relationships between people become ever more critical for learning (McDonald and Ackerman 1998). However, work tasks increasingly are divided and shared across groups of people who are distributed. Therefore it seems that individuals have fewer opportunities to connect and form conventional face-to-face, working relationships (Bietz 2013). These shifts in work patterns change the ways in which we view work relationships and how people draw on others for professional learning.

Relationships are not only changing within groups of workers, but relationships between employees and organisations are altering. People are no longer working in a specific role in a single organisation for an extended period of time (Beck 2000). They may work across several roles or change jobs frequently. Increasing numbers of people are choosing self-employment or multiple employment (ibid). Connections with co-workers and even with organisations, can be transitory. This issue is particularly difficult in work processes where people are contracted to work on specific work tasks, rather than in job roles, for example crowd work (Nickerson 2013). Similar to distributed work, crowd work involves distributed sets of people connecting via networked technology to perform a set of work tasks (Nickerson et al. 2009). However, the difference between distributed work and crowd work is in the ways that people connect (Kittur et al. 2013). While in distributed work individuals are intentionally brought together as teams to work on a specific problem, crowd work enables organisations to outsource discrete tasks to large numbers of disconnected individuals, who often have no knowledge of others who are working on similar tasks. Examples of crowd work include Mechanical Turk (<https://www.mturk.com>), which uses a technology system to assign people short work tasks. These sorts of emerging work practices alter relationships between people, organisations and products. First, since people are contracted to work on specific work tasks, rather than in job roles, their associations with organisations are sometimes underdeveloped. Second, people who connect with others in large groups to work on a specific task may not know, or form work relationships with, their colleagues. Third, by drawing on the input of large numbers of people, outputs of work tasks become difficult to attribute to an individual person, or even a group of people.

When people share the same working space it seems easier to establish conventional working relationships (Bos et al. 2006). People who collaborate with others in distributed groups may not know other colleagues well or may interact with them only as long as it takes to complete a single task (Bietz 2013). Consequently, interpersonal and group dynamics that are taken for granted in face-to-face settings may suffer.

However, distributed teams have different forms of professional practice that provide unique opportunities for individuals to learn, particularly in situations where the teams comprise people with diverse expertise (Bos et al. 2006).

For informal learning, people have to find others with specific expertise to help them solve problems (McDonald and Ackerman 1998). Group members have to maintain an awareness of each others' knowledge (Argote and Miron-Spektor 2011; Edwards 2011). Knowing what others know and what they are working on is extremely difficult. Social semantic web technologies are being developed to raise people's awareness of the knowledge available within their network as they plan their learning and development. These technology systems offer new ways of connecting individual employees in ways that help them plan their learning trajectory by drawing on the collective knowledge within an organisation and beyond.

Knowledge workers use a variety of social software tools in their daily work and learning (Siadaty et al. 2013). These tools connect individuals with the collective knowledge distributed across different social networks and technologies. Typical examples of social software tools are conferencing tools (Skype or Google Hangout), blogs, microblogs (Twitter), wikis, social network sites, RSS-feeds, sharing services, social bookmarking and tagging tools (Breslin et al. 2011). These sorts of applications have enabled learners to support one another's learning, to model practice and epistemic values, to engage in dialogue and collaboratively construct knowledge (Dron and Anderson 2009). Various perspectives on learning view these forms of knowledge construction in different ways: connectivism stresses the importance of connecting people and knowledge through digital networks (Siemens 2005), constructionism place emphasis on the social creation of knowledge (Papert and Harel 1991) while triological learning highlights the intersection of the individual with collective knowledge (Paavola and Hakkarainen 2005).

As individuals interact with the collective knowledge within a social network, they leave digital 'traces' of their actions and interactions (Littlejohn et al. 2012). These traces can be turned into relevant, contextualised information that can support continual learning (Jeremić et al. 2013). Learner interactions can be collected and aggregated within specific ontologies that provide structure and meaning to the data. This allows the data to be analysed, providing learners with feedback, recommendations, or new knowledge that would not be available through directly accessing the contributions of other people (*ibid*). A number of prototype systems that feed back data in ways that support professional learning have been developed. Examples include GroupMe! – a system designed to allow groups of learners to use, share and integrate collective knowledge (Abel Henze et al. 2009) and MetaMorphosis+, an online environment to build collaborative knowledge in the domain of medicine (Kaldoudi et al. 2011).

Other forms of social semantic technology systems are using learning analytics to raise people's awareness of the knowledge available in their networks. Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts (Siemens and Gasevic 2012). The data is used to understand and optimise learning processes and the environment in which these occur. Learning analytics is mainly used in formal learning settings, such as professional

training or education. Its key components include data, goals, measures of goal attainment, models that compute the value of goal attainment and predictive models that use these values as variables, modelling results from the given data (Berendt et al. 2013). Learning analytic systems use automatic or semi-automatic ways of reporting results to selected stakeholders (learners or tutors). Optionally, the data can be used within an application designed to improve learning. Examples of learning analytic applications include, connecting learners with similar learning goals to promote collaboration (Littlejohn et al. 2012); utilising 'clickstream' data – information about sourced materials or user input - to give learners feedback about their learning behaviours and choices (Ferguson and Buckingham Shum 2012); using learner models to recommend personalised learning resources to learners (Greller and Drachsler 2012); or applying predictive models to forecast when a learner is 'at risk of dropping out' (Berendt et al. 2013). In formal learning settings, analytics focus at the level of a 'course' or another administrative structure (Ferguson and Buckingham Shum 2012). By contrast, in informal learning settings, analytics focus at the level of groups and networks of learning (Berendt et al. 2013). Informal learning settings have no set syllabus, course structure, or accreditation and learning interactions are not usually guided by teacher-learner relationships. One example of an informal, professional learning setting is a 'learning network' – groups of professionals who learn by sharing and developing knowledge within digital network environments (Sloep and Berlanga 2011).

These transformations in professional learning allow us to identify key issues that should be addressed in the future.

43.4 Future Directions for Technology-Enhanced Professional Learning

A number of key directions for future research and development within Technology-enhanced Professional Learning arise from our discussion.

First, *an integrated analysis of work practices, learning processes and technology use* is critical to the development of a better understanding of professional learning. In our analysis we highlighted the close intertwinement of work and learning. This intertwinement means that understanding what and how people learn at work and how to support these learning processes with technology is impossible without an in-depth understanding of the work itself. Therefore, future research in Technology-enhanced Professional Learning should be firmly grounded in the analysis of the technology-mediated work practices, establishing empirical connections with work practices within the various contexts and domains of investigation. Although there is a growing body of literature providing (largely journalistic) accounts of digitally-mediated work practices (Howe 2008; Nielsen 2011; Shirky 2008; Tapscott and Williams 2010) these do not examine learning processes. Similarly, recent studies describing learning and work practices (Eraut 2002; Billett 2010) tend to overlook the technological dimension of learning.

Second, this sort of integrated understanding of work, learning and technology requires *strengthening the interdisciplinary dialogue*. As the reader can see from the scope of the literature discussed in the previous sections research and development in work practices, learning processes and digital technologies is conducted within a range of disciplines – sociology, learning sciences, organisational learning and management sciences, computer sciences and information systems, to name a few. Therefore, the refinement of the understanding in Technology-enhanced Professional Learning requires a concerted, interdisciplinary analytical effort, drawing on the wide range of foundational and applied disciplines concerned with human learning, work and technology – not only sociology, workplace learning, management and organisation studies, and computer and information science, but also psychology, economics, biology, political economy, and others. At present, such a systematic, wide-ranging interdisciplinary effort is lacking. Future work in this area should build upon the conceptual, empirical and methodological instrumentation developed and practiced within these different disciplines. To strengthen the interdisciplinary dialogue, action at two levels is required: at the level of the individual researcher and at the systemic level of the field (Lyall et al. 2011). At the individual level, researchers can increase their awareness of relevant literature from the different relevant disciplines. At the systemic level, the development of interdisciplinary curricula for training early-career TEPL researchers would be useful, as would the establishment and the expansion of the number of systematically structured interdisciplinary discussion fora, for instance interdisciplinary networks or special interest groups within key professional associations.

Thirdly, *improving research methodology* is critical. Much of the research in Technology-enhanced Professional Learning relies on retrospective, self-report methods and on laboratory experiments conducted in controlled settings where few of the critical workplace interdependencies and environmental influences are observed. Yet the dangers of overreliance on self-reported, retrospective methods are known. In particular, previous research has suggested those individuals' judgments of their learning may be inaccurate (Townsend and Heit 2011) and that individuals may have limited or no direct introspective access to higher order cognitive processes such as learning (Nisbett and Wilson 1977). Methodological limitations impede the development of a holistic view of how technology-enhanced professional learning occurs in real-world workplace settings. Future research should incorporate methods that allow a more holistic, in-situ, multidimensional and longitudinal analysis of learning processes, work practices and technology use patterns in realistic, workplace settings. Potential solutions include the application of real-time data capture and of data triangulation approaches such as ethnographic methods (Szymanski and Whalen 2011) and building on a mixture of qualitative and quantitative, intra-individual and inter-individual measures (Johnson and Onwuegbuzie 2004).

In conclusion, the co-evolution of work and technology practices offer opportunities for how professional learning is conceptualised and instantiated. The framework for Technology-enhanced Professional Learning defined in this chapter can be used to plan and take forward new forms of professional learning supported and enhanced by digital technologies.

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Part VI

Assessing Professional Learning

This part addresses research on issues of judging, evaluating, monitoring, and assessing professional learning. The articles address evaluation processes on the micro-, meso-, and macro level of analysis by exploring methodological and normative issues of work related judgement processes. Research that reports how professional learning can be assessed and the means by which the assessment progresses feature within this final part. This featuring largely focuses on making judgements about what constitutes professional competence, means for validly and reliably assessing that learning, and extends through to considerations and practices associated with the evaluation of education programs, provisions of educational institutions and other kinds of experiences that seek to secure, certifying and order professional knowledge.

The contributions here commence with Thomas R. Guskey's chapter entitled – *Evaluating professional learning* (Chap. 44). The author takes the opportunity to introduce and explore key concepts and practices associated with evaluation through a consideration of how these can be understood and practiced in an era of professional accountability. He structures this contribution through a consideration of the meaning of evaluation, the purposes it serves and what are its critical applications. All this is directed towards informing the ways in which professional education and learning can be planned and enacted in ways focused on key outcomes, in this case accountability. Similar sentiments and foundational issues are addressed in the chapter by Dineke E. H. Tigelaar and Cees P. M. van der Vleuten, entitled – *Assessment of professional competence* (Chap. 45). They propose that the single purpose of assessing professional competence is aligned with developing that competence. They hold that different forms of assessment can assist the development of this competence in particular ways and that assessment practices for both educational and practice-based purposes including formative and summative assessment are central to this goal. Yet, salient here is the development of capacities such as expert judgement, developing guidelines for assessment and more broadly enhancing the impact of assessment upon learning.

In her contribution, Tara Fenwick returns to the issue of professional accountability and its manifestations with the mechanisms of regulatory agencies and measurable outputs. In the chapter – *Assessment of professional learning in practice* (Chap. 46) – she outlines a series of conflicting and complicating factors that blur the distinctions amongst the purposes of assessment within an era of accountability. Above all, she makes the case for having useful assessment which it is purposes and processes that need to reduce the complexity of the monomer being assessed but are helpful in making judgements about professional performance and in ways which are not tied to individual performances. Examples from teaching pharmacy and accounting are used to elaborate these ideas and emphasise fidelity to the practice about which judgements are made. Following this theme on judgements within assessment, Patrick Griffin, Esther Care, Judith Crigan, Pamela Robertson, Zhonghua Zhang and Alejandra Arratia-Martinez discuss how teachers can further develop their decision-making capacities to improve and offer comprehensive assessments of student learning. Entitled – *The influence of evidence-based decisions by collaborative teacher teams on student achievement* (Chap. 47) – the key focus here is on a collaborative efforts by teachers to develop their capacities for organising effective assessment practices and, in particular, developing their decision-making capacities in ways which use student data more fully to arrive at decisions about student achievement. These efforts are also directly linked to improving particular kinds of outcomes and embed assessment within curriculum considerations, rather than being seen as separate from and making post-event justifications about it. Importantly, their contribution with advancing the conception of assessment and learning partnerships as premises for promoting intentional educational interventions and effective learning informed by collaborative assessment practices.

Finally, in this part, a contextualised and expansive approach to student assessment is illustrated and discussed by Frank Achtenhagen and Esther Winter in their contribution entitled – *Large-scale assessment of vocational education and training* (Chap. 48). This chapter illustrates the way in which a very large assessment process can be enacted through adopting a series of typical workplace tasks associated with the field of business administration. These tests were identified as being common to these fields across a range of European countries. Subsequently, these tasks are then presented through a web-based format aiming to provide authentic activities and valid assessments through students' engagement with them. Through these processes, effective assessment and comparable data can be gathered and analysed and decision-making informed about the nature of workplace learning and the kinds of knowledge which are developed and their contributions to professional competence.

Chapter 44

Evaluating Professional Learning

Thomas R. Guskey

Abstract This chapter describes the process of evaluating professional learning initiatives in education, especially within the context of accountability. Three basic questions are addressed: (1) What does evaluation mean in this context? (2) What purposes do professional learning evaluations serve? and (3) What are the critical levels of professional learning evaluation? The importance of these evaluation issues is discussed, along with how their clarification can help guide professional learning planning and implementation. Finally the implications of these critical professional learning issues are considered with regard to the current press for accountability in education.

Keywords Professional learning • Professional development • Evaluation • Effectiveness • Student learning

The press for accountability is driving many reforms in education today. Educators at all levels are being asked to provide evidence to show that what they do makes a difference. In most cases these requests for evidence relate to the impact of school leaders and teachers on student achievement. But increasing, such requests extend to educators' learning as well. Questions are raised about the value of the professional learning experiences in which educators engage, the impact of those experiences on their professional practice, and the effects of those practices on student learning outcomes.

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Historically, educators have considered professional learning and development to be their right. Throughout the world, time for professional learning is included in nearly all teachers' contracts for employment. But in recent years, government officials and policy-makers concerned with accountability have begun to question that right. As economic conditions decline and education budgets grow tight, they look at what schools spend on educators' professional learning and want to know what benefits it brings. Does the school or school district's investment in professional learning for educators yield tangible payoffs, or might that money be spent in better ways? Such questions highlight the importance of evaluating the effects of educators' professional learning (Guskey 1998, 1999).

The professional learning experiences of educators cover a broad range of activities. Many of those experiences involve personal reflections on the everyday interactions between teachers and students. Teachers regularly try new approaches to instruction, gather information to learn how well those approaches work for their students, and then decide what changes need to be made or what instructional alternatives might be considered to improve students' learning success. Thoughtful deliberations on these ongoing classroom interactions are a vital part of every teacher's professional learning.

In addition, school leaders and teachers also take part in a variety of more structured professional learning experiences specifically designed to enhance their knowledge and improve their professional skills. These experiences include not only the broad spectrum of seminars and workshops in which educators engage, but also online programs, peer observations, professional learning communities, coaching or mentoring, university courses, conferences, and the like. In this chapter we will focus primarily on evaluating the effects of these more structured and formalized professional learning activities.

44.1 The Lack of Good Evidence

Educators generally pay little attention to evaluating their professional learning activities, even those that are more structured. When they do, those evaluations tend to be restricted to descriptive accounts of what took place or surveys of participants' reactions to the experience. Rarely do evaluations consider the impact on teachers' classroom practices or resultant improvements in student learning. Two large-scale reports produced in the United States point explicitly to the extent of this lack of well-designed evaluations.

In *Reviewing the Evidence on How Teacher Professional Development Affects Student Achievement* (Yoon et al. 2007), a team of scholars from the American Institutes for Research analyzed the findings from over 1,300 studies and evaluation reports published over a period of 20 years that potentially addressed the impact of teachers' professional learning on student learning outcomes. Using the U.S. Department of Education's "What Works Clearinghouse (WWC) Evidence Standards" to judge the quality of evidence presented in these investigations, the team identified

only *nine* studies of sufficient quality for drawing valid conclusions about the characteristics of effective professional development for educators (see Guskey and Yoon 2009). All of the other studies and reports had significant design or methodological flaws that challenged the credibility of their findings.

The second report, *Does Teacher Professional Development Have Effects on Teaching and Learning?* (Blank et al. 2008), came from the Council of Chief State School Officers' study of teacher professional development programs in mathematics and science sponsored by the U. S. National Science Foundation. The authors of this report reviewed evaluation studies from a voluntary sample of 25 professional development programs nominated by 14 states. Presumably, these programs represent the best of the best. Their analysis of study reports and papers from these nominated programs revealed that only *seven* program evaluations reported measureable effects of teacher professional development on subsequent student outcomes. No examination of the quality or validity of this evidence was conducted.

Some might argue that significant progress has been made in more recent years and that our knowledge of effective professional learning is improving. But even the most current evidence indicates that much of the research on educators' professional learning, as well as most evaluations of professional development initiatives, continue to be descriptive rather than quantitative (Sawchuk 2010). Hard data on what professional learning models lead to better teaching and improved student learning remain difficult to find (Viadero 2011). In addition, new investigations employing rigorous methodological designs continue to yield uninspiring results.

Two recent, randomized field studies funded by the U.S. Department of Education, for example, investigated intensive professional development programs. Both studies found no effects on student achievement, even though the programs were generally aligned with the characteristics of effective professional development identified in the Yoon et al. (2007) review. In the first study, two professional learning approaches based on a popular early reading program were found to increase teachers' knowledge of literacy development and their use of explicit reading instruction during the year of the intervention, but had little effect on the reading achievement of second grade students in high-poverty schools (Garet et al. 2008). In the second investigation, a professional development initiative focusing on secondary math was found to have significant effect on instructional practice but little impact on teachers' content knowledge or students' learning (Garet et al. 2011). Neither study offered sufficient evidence to direct specific improvement efforts.

What lessons can be gained from these recent studies and the earlier reviews? First, they make clear how few well-designed investigations and evaluation reports currently exist to adequately judge the effectiveness of educators' professional learning experiences. While numerous studies and reports claim to have addressed this issue, most lack the rigor necessary to draw valid conclusions. But second and more important, they also represent a call to action for educators at all levels to plan better studies and more systematic evaluations in order to gain the critical evidence needed to guide improvements in professional learning programs and practice.

44.2 The Need for Sound Evaluations

The reasons so little good evidence currently exists on the effects of educators' professional learning experiences are a matter of speculation. It may be educators' commonly held perception of evaluation as a costly, time-consuming process that diverts attention from important planning, implementation, and follow-up activities. In addition, many educators undoubtedly believe that they lack the skill and expertise needed to become involved in rigorous evaluations. As a result they either ignore evaluation issues completely, or leave them to "evaluation experts" who are called in at the end and asked to determine if what was done made any difference. Sadly, these last-minute, post hoc evaluation efforts are seldom adequate in determining any experience or activity's true effects.

Good evaluations, however, do not have to be costly or complicated. What they require is thoughtful planning, the ability to ask good questions, and a basic understanding of how to collect appropriate evidence in order to find valid answers. In many ways, good evaluations are merely the refinement of everyday thinking. They provide sound, meaningful, and sufficiently reliable information that allows thoughtful and responsible decisions to be made about professional learning processes and effects.

In this chapter we will explore the evaluation of educators' professional learning experiences within the context of accountability. Three basic questions are addressed: (1) What does evaluation mean in this context? (2) What purposes do professional learning evaluations serve? and (3) What are the critical levels of professional learning evaluation? Finally the implications of the answers to these questions are considered with regard to accountability issues.

44.3 What Does Evaluation Mean in This Context?

Just as there are many forms of professional learning for educators, there are also many forms of evaluation. While experts may disagree on the best definition of evaluation, a useful operational definition for most purposes is: *Evaluation is the systematic investigation of merit or worth* (adapted from the Joint Committee on Standards for Educational Evaluation 1994).

Each part of this definition holds special significance. The word "systematic" distinguishes this process from the multitude of informal evaluation acts in which people consciously engage. "Systematic" implies that evaluation in this context is thoughtful, intentional, and purposeful. It is done for clear reasons and with explicit intent. Although its specific purpose may vary from one setting to another, all good evaluations are organized and deliberate.

Because it is systematic, some educators mistakenly believe that professional learning evaluation is appropriate only for planned seminars and workshops, but not for the wide range of other less structured, ongoing, job-embedded professional learning activities. Regardless of the form it takes, however, professional learning is

not a haphazard process. It is, or should be, purposeful and results- or goal-driven (Schmoker 2004, 2006). Its objectives remain clear: to make a positive difference in teaching, to help educators reach high standards and, ultimately, to have a positive impact on students. This is true of seminars and workshops, as well as study groups, professional learning communities, action research, collaborative planning, curriculum development, structured observations, peer coaching and mentoring, and individually-guided professional learning activities. To determine if the goals of these activities are met, or if progress is being made, requires systematic evaluation.

“Investigation” refers to collecting and analyzing appropriate and pertinent information. While no evaluation can be completely objective, the process is not founded on opinion or conjecture. Rather, it is based on acquiring specific, relevant, and valid evidence examined through appropriate methods and techniques.

Using “merit or worth” in the definition implies appraisal and judgment. Evaluations are designed to determine something’s value. They help answer questions such as:

- Is this experience or activity leading to the intended results?
- Is it better than what was done in the past?
- Is it better than another, competing activity?
- Is it worth the costs?

Answers to these questions require more than a statement of findings. They demand an appraisal of quality and judgments of value, based on the best evidence available. Such appraisals are the basis of accountability.

44.4 What Purposes Do Professional Learning Evaluations Serve?

The purposes of evaluation are generally classified in three broad categories: *planning*, *formative*, and *summative*. Most evaluations actually fulfill all three of these purposes, although the emphasis on each changes during various stages of the evaluation process. While this blending of purposes blurs their distinction, differentiating their intent helps clarify understanding of evaluation procedures (Stevens et al. 1995).

44.4.1 Planning

Planning evaluation occurs *before* a professional learning program or activity begins, although certain aspects may be continual and ongoing. It is designed to give those involved in program development and implementation a precise understanding of what is to be accomplished, what procedures will be used, and how success will be determined. In essence, it lays the groundwork for all other evaluation activities. While some advocate an “evaluability assessment” prior to planning as a

means of determining if a professional learning experience or activity is “evaluable” (Wholey et al. 2004), others contend that planning evaluation done well makes such assessment unnecessary (Guskey 2000a).

Planning evaluation involves appraisal of a professional learning program or activity’s critical attributes, usually on the basis of previously established standards. These include the specified goals, the proposal or plan to achieve those goals, the concept or theory underlying the proposal, the overall evaluation plan, and the likelihood that plan can be carried out with the time and resources available. In addition, planning evaluation typically includes a determination of needs, assessment of the characteristics of participants, careful analysis of the context, and the collection of relevant baseline information.

Evaluation for planning purposes is sometimes referred to as “preformative evaluation” (Scriven 1991) and may be thought of as “preventative evaluation.” It helps decision makers know if professional learning endeavors are headed in the right direction and likely to produce the desired results. It also helps identify and remedy early on the difficulties that might plague later evaluation efforts. Furthermore, planning evaluation helps ensure that other evaluation purposes can be met in an efficient and timely manner.

44.4.2 Formative

Formative evaluation occurs *during* the operation of a professional learning experience or activity. Its purpose is to provide those responsible for the activity with ongoing information about whether things are going as planned and if expected progress is being made. If not, this same information can be used to guide necessary improvements (Scriven 1967).

The most useful formative evaluations focus on the conditions for success. They address issues such as:

- What conditions are necessary for success?
- Have those conditions for success been met?
- Can they be improved?

In many cases, formative evaluation is a recurring process that takes place at multiple times throughout the life of the professional learning program or activity. Many program developers, in fact, constantly engage in the process of formative evaluation. They use evidence gathered at each step of development and implementation to make adjustments, modifications, or revisions (Fitzpatrick et al. 2004).

To keep formative evaluations efficient, Scriven (1991) recommends using them as “early warning” evaluations. In other words, they provide an early version of the final, overall evaluation. As development and implementation proceed, formative evaluation can consider intermediate benchmarks of success to determine what is working as expected and what difficulties must be overcome. Flaws can be identified and weaknesses located in time to make the adaptations necessary for success.

44.4.3 *Summative*

Summative evaluation is conducted *at the completion* of a professional learning experience or activity. Its purpose is to provide program developers and decision makers with judgments about the program or activity's overall merit or worth. Summative evaluation describes what was accomplished, what the consequences were (positive and negative), what the final results were (intended and unintended), and, in some cases, whether the benefits justify the costs (P. Phillips 2002).

Unlike formative evaluations that are used to guide improvements, summative evaluations present decision makers with the information they need to make crucial decisions about a professional learning program or activity. Should it be continued? Continued with modifications? Expanded? Discontinued? Ultimately, its focus is "the bottom line."

Summative evaluation may focus on either internal or external interests. In other words, it may address issues relevant to program designers who want to know if the professional learning experience truly accomplished the goals for which it was intended. But in many instances, summative evaluation addresses the concerns of external parties such as policy makers, funding organizations, or government agencies. These efforts often take the form of "third-party evaluations," in which a group other than the program designers or those implementing the program is asked to gather and analyze evidence on the effects, presumably to offer an impartial perspective on the results.

Perhaps the best description of the distinction between formative and summative evaluation is one offered by Robert Stake: "When the cook tastes the soup, that's formative; when the guests taste the soup, that's summative" (quoted in Scriven 1991, p. 169).

Unfortunately, many educators associate evaluation with its summative purposes only. Important information that could help guide planning, development, and implementation is often neglected, even though such information can be key in determining a professional learning program or activity's overall success. Summative evaluation, although necessary, often comes too late to be much help. Thus, while the relative emphasis on planning, formative, and summative evaluation changes through the life of a professional learning program or activity, all three are essential to a meaningful evaluation.

44.5 What Are the Critical Levels of Professional Learning Evaluation?

Planning, formative, and summative evaluation all involve collecting and analyzing information. Effective professional learning evaluation requires consideration of the five critical stages or levels of information shown in Table 44.1 (Guskey 2000a, 2002a, 2005). These five levels represent an adaptation of an evaluation model developed by Kirkpatrick (1959, 1998) for judging the value of supervisory training

Table 44.1 Five levels of professional learning evaluation

Evaluation level	What questions are addressed?	How Will information be gathered?	What is measured or assessed?	How will information be used?
1. Participants' reactions	Did they like it? Was their time well spent? Did the material make sense? Will it be useful? Was the leader knowledgeable and helpful? Were the refreshments fresh and tasty? Was the room the right temperature? Were the chairs comfortable?	Questionnaires or surveys administered at the end of the session.	Initial satisfaction with the experience	To improve program design and delivery
2. Participants' learning	Did participants acquire the intended knowledge and skills?	Paper-and-pencil instruments Simulations Demonstrations Participant reflections (oral and/or written) Participant portfolios	New knowledge and skills of participants	To improve program content, format, and organization

<p>3. Organizational support and change</p>	<p>Were sufficient resources made available? Were problems addressed quickly and efficiently? Was implementation advocated, facilitated, and supported? Were successes recognized and shared? Was the support public and overt? What was the impact on the organization? Did it affect organizational climate and procedures?</p>	<p>Minutes from follow-up meetings. Questionnaires Structured interviews with participants and district or school administrators District and school records Participant portfolios</p>	<p>The organization's advocacy, support, accommodation, facilitation, and recognition. To inform future change efforts</p>	<p>To document and improve organizational support</p>
<p>4. Participants' use of new knowledge and skills</p>	<p>Did participants effectively apply the new knowledge and skills?</p>	<p>Questionnaires Structured interviews with participants and their supervisors Participant reflections (oral and/or written) Participant portfolios Direct observations Video or audio tapes</p>	<p>Degree and quality of implementation</p>	<p>To document and improve the implementation of program content</p>

(continued)

Table 44.1 (continued)

Evaluation level	What questions are addressed?	How Will information be gathered?	What is measured or assessed?	How will information be used?
5. Student learning outcomes	<p>What was the impact on students?</p> <p>Did it affect student performance or achievement?</p> <p>Did it influence students' physical or emotional well-being?</p> <p>Are students more confident as learners?</p> <p>Is student attendance improving?</p> <p>Are dropouts decreasing?</p>	<p>Student records</p> <p>School records</p> <p>Questionnaires</p> <p>Structured interviews with students, parents, teachers, and/or administrators</p> <p>Participant portfolios</p>	<p>Student learning outcomes: Cognitive (performance and achievement)</p> <p>Affective (attitudes and dispositions)</p> <p>Psychomotor (skills and behaviors)</p>	<p>To focus and improve all aspects of program design, implementation, and follow-up</p> <p>To demonstrate the overall impact of professional development</p>

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programs in business and industry. Kirkpatrick’s model, although widely applied, has seen limited use in education because of inadequate explanatory power. While helpful in addressing a broad range of “what” questions, many find it lacking when it comes to explaining “why” (Alliger and Janak 1989; Holton 1996).

The five levels in this model are hierarchically arranged, from simple to more complex. With each succeeding level, the process of gathering evaluation information requires more time and resources. And because each level builds on those that come before, success at one level is usually necessary for success at higher levels.

44.5.1 Level 1: Participants’ Reactions

The first level of evaluation looks at participants’ reactions to the professional learning experience. This is the most common form of professional learning evaluation and the easiest type of information to gather and analyze.

At Level 1 the questions addressed focus on whether or not participants liked the experience. Did they feel their time was well spent? Did the content and material make sense to them? Were the activities well planned and meaningful? Was the leader knowledgeable, credible, and helpful? Did they find the information useful?

Also important for some professional learning experiences are questions related to the context, such as: Was the room the right temperature? Were the chairs comfortable? Were the refreshments fresh and tasty? To some, questions such as these may seem silly and inconsequential. But experienced professional development leaders know the importance of attending to these basic human needs.

Information on participants’ reactions is usually gathered through questionnaires handed out at the end of a program or activity, or by online surveys distributed later through email. These questionnaires and surveys typically include a combination of rating-scale items and open-ended response questions that allow participants to provide more personalized comments. Because of the general nature of this information, many organizations use the same questionnaire or survey for all of their professional learning activities, regardless of the format.

Some educators refer to these measures of participants’ reactions as “happiness quotients,” insisting that they reveal only the entertainment value of an experience or activity, not its quality or worth. But measuring participants’ initial satisfaction provides information that can help improve the design and delivery of professional learning programs or activities in valid ways. In addition, positive reactions from participants are usually a necessary prerequisite to higher level evaluation results.

44.5.2 Level 2: Participants’ Learning

In addition to liking their professional learning experiences, participants ought to learn something from them. Level 2 focuses on measuring the new knowledge, skills, and perhaps attitudes or dispositions that participants gained (Guskey 2002b).

Depending on the goals of the professional learning program or activity, this can involve anything from a pencil-and-paper assessment (Can participants describe the critical attributes of effective questioning techniques and give examples of how these might be applied in common classroom situations?) to a simulation or full-scale skill demonstration (Presented with a variety of classroom conflicts, can participants diagnose each situation, and then prescribe and carry out a fair and workable solution?). Oral or written personal reflections, or examinations of the portfolios participants assemble also can be used to document their learning.

Although Level 2 evaluation information often can be gathered at the completion of a professional learning program or activity, it usually requires more than a standardized form. And because measures must show attainment of specific learning goals, indicators of successful learning need to be outlined *before* activities begin.

Careful evaluators also consider possible “unintended” learning outcomes, both positive and negative. Professional learning activities that engage teachers and school leaders in collaboration, for example, can additionally foster a positive sense of community and shared purpose among participants (Supovitz 2002). But in some instances, individuals collaborate to block change or inhibit advancement (Corcoran et al. 2001; Little 1990). Investigations further show that collaborative efforts sometimes run headlong into enormous conflicts over professional beliefs and practices that can impede progress (Achinstein 2002). Thus even the best planned professional learning endeavors occasionally yield completely unanticipated negative consequences.

If there is concern that participants may already possess the requisite knowledge and skills, some form of pre- and post-assessment may be required. Analyzing this information provides a basis for improving the content, format, and organization of professional learning programs and activities.

44.5.3 Level 3: Organizational Support and Change

At Level 3 the focus shifts from participants to organizational dimensions that may be vital to the success of the professional learning experience or activity. Organizational elements also can sometimes hinder or prevent success, even when the individual aspects of professional development are done right (Sparks 1996).

Suppose, for example, that a group of secondary educators participates in a professional learning experience on aspects of cooperative learning. As part of their experience they gain an in-depth understanding of cooperative learning theory and organize a variety of classroom activities based on cooperative learning principles. Following their learning experience they implement these activities in classes where students are graded or marked “on the curve,” according to their relative standing among classmates, and great importance is attached to each student’s individual class rank. Organizational grading policies and practices such as these, however, make learning highly competitive and thwart the most valiant efforts to have students cooperate and help each other learn. When graded “on the curve,” students must

compete against each other for the few scarce rewards (high grades) dispensed by the teacher. Cooperation is discouraged since helping other students succeed lessens the helper's chance of success (Guskey 2000b).

The lack of positive results in this case does not reflect poor training or inadequate learning on the part of the participating teachers, but rather organizational policies that are incompatible with implementation efforts. Problems at Level 3 have essentially canceled the gains made at Levels 1 and 2 (Sparks and Hirsh 1997). That is precisely why professional learning evaluations must include information on organizational support and change.

Level 3 questions focus on the organizational characteristics and attributes necessary for success. Did the professional learning activities promote changes that were aligned with the mission of the school? Were changes at the individual level encouraged and supported at the building and district levels (Corcoran et al. 2001)? Were sufficient resources made available, including time for sharing and reflection (Colton and Langer 2005; Langer and Colton 1994)? Were successes recognized and shared? Issues such as these often play a large part in determining the success of any professional learning program.

Procedures for gathering information at Level 3 differ depending on the goals of the professional learning program or activity. They may involve analyzing school records, examining the minutes from follow-up meetings, administering questionnaires that tap issues related to the organization's advocacy, support, accommodation, facilitation, and recognition of change efforts. Structured interviews with participants and school administrators also can be helpful. This information is used not only to document and improve organizational support for professional learning, but also to inform future change initiatives.

44.5.4 Level 4: Participants' Use of New Knowledge and Skills

At Level 4 the primary question is: Did the new knowledge and skills that participants learned make a difference in their professional practice? The key to gathering relevant information at this level of evaluation rests in specifying clear indicators of both the degree and quality of implementation. Unlike Levels 1 and 2, this information cannot be gathered at the end of a professional learning program or activity. Enough time must pass to allow participants to adapt the new ideas and practices to their settings. And because implementation is often a gradual and uneven process, measures of progress may need to be gathered at several time intervals.

Depending on the goals of the professional learning program or activity, this information may involve questionnaires or structured interviews with participants and their school leaders. Oral or written personal reflections, or examinations of participants' journals or portfolios also might be considered. The most accurate information typically comes from direct observations, either by trained observers or using digital recordings. These observations, however, should be kept as unobtrusive as possible (for examples, see Hall and Hord 1987).

Analyzing this information provides evidence on current levels of use. It also helps professional development leaders restructure future programs and activities to facilitate better and more consistent implementation.

44.5.5 Level 5: Student Learning Outcomes

Level 5 addresses “the bottom line” in education: What was the impact on students? Did the professional learning program or activity benefit them in any way? The particular student learning outcomes of interest will depend, of course, on the goals of that specific professional learning endeavor. In addition to the stated goals, the program or activity may result in important unintended outcomes. Suppose, for example, that students’ average scores on large-scale assessments went up, but so did the school dropout rate. Because mixed results such as this are so typical, evaluations should always include multiple measures of student learning (Chester 2005; Guskey 2007).

Since stakeholders vary in their trust of different sources of evidence, it is unlikely that any single indicator of success will prove adequate or sufficient to all. Providing acceptable evidence for judging the effects of professional learning activities will almost always require multiple sources of evidence. In addition, these sources of evidence must be carefully matched to the needs and perceptions of different stakeholder groups (Guskey 2012).

Results from large-scale assessments and nationally-normed standardized exams may be important for accountability purposes and will need to be included. In addition, school leaders often consider these measures to be valid indicators of success. Teachers, however, generally see limitations in large-scale assessment results. These types of assessments are typically administered only once per year, and results may not be available until several months later. By that time, the school year may have ended and students promoted to another teacher’s class. So while important, many teachers do not find such results particularly useful (Guskey 2007).

Teachers put more trust in results from their own assessments of student learning – classroom assessments, common formative assessments, and portfolios of student work. They turn to these sources of evidence for feedback to determine if the new strategies or practices they are implementing really make a difference. Classroom assessments provide timely, targeted, and instructionally relevant information that also can be used to plan revisions when needed. Since teachers comprise a major stakeholder group in any professional learning activity, sources of evidence that they trust and believe will be particularly important to include.

Measures of student learning typically include cognitive indicators of student performance and achievement, such as assessment results, portfolio evaluations, marks or grades, and scores from standardized tests. But in addition, affective and behavioral indicators of student performance can be relevant as well. Student surveys designed to measure how much students like school; their perceptions of teachers, fellow students, and themselves; their sense of self-efficacy, and their confidence in new learning situations can be especially informative. Evidence on school attendance,

enrollment patterns, dropout rates, class disruptions and disciplinary actions are also important outcomes. In some areas, parents' or families' perceptions may be a vital consideration. This is especially true in initiatives that involve changes in grading practices, report cards, or other aspects of school-to-home and home-to-school communication (Epstein and Associates 2009; Guskey 2002c).

Furthermore, Level 5 evaluations should be made as methodologically rigorous as possible. Rigor, however, does not imply that only one evaluation method or design can produce credible evidence. Although randomized designs (i.e., true experimental studies) represent the gold-standard in scientific research, especially in studies of causal effects, a wide range of quasi-experimental designs can produce valid results. When evaluations are replicated with similar findings, that validity is further enhanced. One of the best ways to enhance an evaluation's methodological rigor, however, is to plan for meaningful comparisons.

In many cases evidence on outcomes at Level 5 is gathered from a single school or school district in a single setting for a restricted time period. Unfortunately, from a design perspective, such evidence lacks both reliability and validity. Regardless of whether results are positive or not, so many alternative explanations may account for the results that most authorities would consider such outcomes dubious at best and meaningless at worst (Guskey and Yoon 2009).

It may be, for example, that the planned professional learning endeavors did, indeed, lead to noted improvements. But maybe the improvements were the result of a change in leadership or personnel instead. Maybe the community or student population changed. Maybe changes in government policies or assessments made a difference. Maybe other simultaneously implemented interventions were responsible. The possibility that these or other extraneous factors influenced results makes it impossible to draw definitive conclusions.

The best way to counter these threats to the validity of results is to include a comparison group – another similar group of educators or schools not involved in the current activity or perhaps engaged in a different activity. Ideal comparisons involve the random assignment of students, teachers, or schools to different groups. But because that is rarely possible in most education settings, finding similar classrooms, schools, or school districts provides the next best option. In some cases involvement in a professional learning activity can be staggered so that half of the group of teachers or schools that volunteer can be randomly selected to take part initially while the others delay involvement and serve as the comparison group. In other cases comparisons can be made to “matched” classrooms, schools, or school districts that share similar characteristics related to motivation, size, and demographics.

Using comparison groups does not eliminate the effects of extraneous factors that might influence results. It simply allows planners greater confidence in attributing the results attained to the particular program or activity being considered. In addition, other investigative methods may be used to formulate important questions and develop new measures relating to professional growth (Raudenbush 2005).

Student and school records provide the majority of information at Level 5. Results from questionnaires and structured interviews with students, parents, teachers, and administrators could be included as well. Level 5 information is used summatively to document a program or activity's overall impact. But formatively,

it can help guide improvements in all aspects of professional learning, including design, implementation, and follow-up. In some cases information on student learning outcomes is used to estimate the cost effectiveness of professional learning programs and activities, sometimes referred to as “return on investment,” or “ROI evaluation” (Parry 1996; Phillips 1997; Todnem and Warner 1993).

44.6 Implications for Improvement

Three important implications stem from this model for evaluating professional learning. First, each of the five evaluation levels is important. Although evaluation at any level can be done well or poorly, the information gathered at each level provides vital data for improving the quality of professional learning programs and activities. And while each level relies on different types of information that may be gathered at different times, no level can be neglected.

Second, tracking effectiveness at one level tells little about impact at the next level. Although success at an early level may be necessary for positive results at the next higher one, it is clearly not sufficient (Cody and Guskey 1997). Breakdowns can occur at any point along the way. Sadly, most government officials and policy makers fail to recognize the difficulties involved in moving from professional learning experiences (Level 1) to improvements in student learning (Level 5). They also tend to be unaware of the complexity of this process, as well as the time and effort required to build this connection (Guskey 1997; Guskey and Sparks 2004).

The third implication, and perhaps the most important, is that in planning professional learning programs and activities to impact student learning, *the order of these levels must be reversed*. In other words, education leaders must plan “backward” (Guskey 2001a, b, 2003), starting where they want to end up and then working back (Hirsh 2012).

44.7 Backward Planning for Accountability

In backward planning, educators first decide what student learning outcomes they want to achieve and what evidence best reflects those outcomes (Level 5). Relevant evidence provides the basis for accountability. School leaders and teachers must decide, for example, if they want to improve students’ reading comprehension, enhance their skills in problem solving, develop their sense of confidence in learning situations, improve their behavior in class, their persistence in school, or their collaboration with classmates. Critical analyses of data from assessments of student learning, samples of student work, and school records are especially useful in identifying these student learning goals.

Next they must determine, on the basis of pertinent research, what instructional practices and policies will most effectively and efficiently produce those outcomes (Level 4). They need to ask questions such as: What evidence verifies that these

particular practices and policies will produce the results we want? How good or reliable is that evidence? Was it gathered in contexts similar to ours? In this process, leaders must be particularly mindful of innovations that are more “opinion-based” than “research-based,” promoted by people more concerned with “what sells” to desperate educators than with “what works” with students. Before jumping on any educational bandwagon, they must make sure that trustworthy evidence validates the chosen approach.

After that, leaders need to consider what aspects of organizational support need to be in place for those practices and policies to be implemented (Level 3). Many valuable improvement efforts fail miserably due to a lack of active participation and clear support from school leaders (Guskey 2004). Others prove ineffective because the resources required for implementation were not provided. The lack of time, instructional materials, or necessary technology can severely impede teachers’ attempts to use the new knowledge and skills acquired through a professional learning experience. A big part of planning involves ensuring that organizational elements are in place to support the desired practices and policies.

Then, leaders must decide what knowledge and skills the participating professionals must have in order to implement the prescribed practices and policies (Level 2). In other words, what must they know and be able to do to successfully adapt the innovation to their specific situation and bring about the sought-after change.

Finally, consideration turns to what set of experiences will enable participants to acquire the needed knowledge and skills (Level 1). Seminars and workshops, especially when paired with collaborative planning, structured opportunities for practice with feedback, and follow-up coaching can be a highly effective means of sharing information and expanding educators’ knowledge. Action research projects, organized study groups, collegial exchange, professional learning communities, and a wide range of other activities can all be effective, depending on the specified purpose of the professional learning activity.

What makes this backward planning process so important is that the decisions made at each level profoundly affect those made at the next. For example, the particular student learning outcomes being sought influence the kinds of practices and policies that need to be implemented. Likewise, the practices and policies to be implemented influence the kinds of organizational support or change required, and so on.

The context-specific nature of this work complicates matters further. Even if school leaders and teachers agree on the student learning outcomes they want to achieve, what works best in one context with a particular community of educators and a particular group of students might not work equally well in another context with different educators and different students. This is what makes developing examples of truly universal “best practices” in professional development so difficult. What works always depends on where, when, and with whom.

Unfortunately, professional developer leaders frequently fall into the same trap in planning that teachers do when they plan their lessons. Teachers often plan in terms of what they are going to do, instead of what they want their students to know and be able to do. Similarly, those planning professional learning programs and activities often focus on what they will do (workshops, seminars, institutes, etc.)

and how they will do it (study groups, action research, peer coaching, etc.). Their planning tends to be “event-based” or “process-based.” This not only diminishes the effectiveness of their efforts, it also makes evaluation much more difficult.

The most effective professional learning planning begins with clear specification of the students learning outcomes to be achieved and the sources of evidence that best reflect those outcomes. With those goals articulated, school leaders and teachers then work backward. Not only will this make planning much more efficient, it also provides a format for addressing the issues most crucial to evaluation. As a result, it makes evaluation a natural part of the planning process and offers a basis for accountability.

44.8 Conclusion

Many good things are done in the name of professional learning. One could argue, in fact, that no significant educational improvement effort has succeeded in the absence of high quality professional development for educators. Unfortunately, many rotten things also pass for professional learning. What leaders in education have not done well is provide evidence to document the difference between the two. The new demands for accountability today make presenting that evidence more crucial than ever.

Evaluation provides the key to making the distinction. The procedures involved in meaningful evaluations are not especially complicated. They also do not require skills beyond those already possessed by most education leaders. Gathering and analyzing evidence on the five levels of professional development evaluation involve simply careful planning and thoughtful deliberation. Leaders who plan backward in that process, beginning with the clear articulation of student learning goals and specification of the evidence that best reflects achievement of those goals, have taken the most important first step. They have created the foundation for meaning and purposeful evaluation. They also have established the basis for addressing any questions regarding accountability. All other aspects of evaluation will stem from that essential first step. Those who proceed in this way will not only improve the quality of educators’ professional learning experiences, they will enhance the success of professional development endeavors everywhere.

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Chapter 45

Assessment of Professional Competence

Dineke E.H. Tigelaar and Cees P.M. van der Vleuten

Abstract This chapter deals with research on judging, evaluating, monitoring and assessing professional competence in educational contexts. In line with current views on assessment and learning, we argue that assessment can and should be used to develop professional competence. Drawing on research from different areas of professional competence, we extend this line of argumentation by contending that learning and instruction can benefit when different methods of assessment are strategically combined in a coherent assessment programme. We will discuss the optimization of education- and practice-related purposes, formative and summative purposes and quality issues in the assessment of professional competence, and conclude with some prospects for supporting expert judgement, developing guidelines for assessment programmes and gaining improved understanding of mechanisms underlying the impact of assessment on learning.

Keywords Professional competence • Assessment methods • Assessment programs

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45.1 Introduction

We discuss from a research perspective, the assessment of professional competence in educational settings. In this chapter we focus on psychological theories in addressing the assessment of professional competence. Professional competence is a complex concept that allows for various definitions. In their seminal paper on the concept of competence, Stoof et al. (2002) stressed that definitions of competence are purpose and context dependent, although this does not preclude commonalities between contexts. One characteristic of professional competence that is shared across domains is the ability of professionals to fulfil complex core tasks by integrating and applying appropriate context- and domain-specific knowledge, skills and attitudes (Stoof et al. 2002). Developers of methods to assess professional competence in educational contexts should define not only professional functioning for the context of interest but also ways of promoting its development. We agree with Stoof et al. (2002) that definitions of competence are purpose- and context-dependent, but we also acknowledge that definitions of professional competence for different areas share important characteristics, such as relevance to the domain of possible encounters within a particular area of practice which a professional is expected to manage effectively (Kane 1992) and the knowledge, skills and judgement the professional is expected to use in managing these encounters.

In the literature several purposes that can be served by assessment of professional competence have been identified. Firstly, assessment can be a selection tool for admission to education and training programmes or job appointments. Secondly, assessment of professional competence can be used to monitor and guide the progress of learners through a training programme. Thirdly, it can be used to determine whether students meet requirements for licensure to practise in their chosen profession and whether staff members qualify for promotion, and finally, results of assessment can be used to monitor the effectiveness of education and training programmes and provide evidence for programme quality. These four purposes: selection, diagnosis, licensure and accountability are usually subdivided into (a) formative assessment focused on diagnosing and monitoring student performance in order to enhance learning and development and (b) summative assessment focused on decision making for selection, licensure and accountability.

We adhere to current views on assessment and learning that assessment for educational purposes can and should concomitantly serve to stimulate learners to develop their professional competence. This viewpoint is consistent with the notion that assessment drives learning (Frederiksen 1984), as reflected in the more recent idea of the integration of assessment, instruction and learning. Integration requires substantial consistency of learning, instruction and assessment, often referred to as the principle of 'alignment' (Biggs 1996). Taking our line of reasoning one step further, we argue that assessment should be used strategically within a programme of assessment so as to maximize its potential as a tool for learning and instruction.

We aim to demonstrate that effective strategic use of assessment in educational contexts relies on carefully chosen methods of assessment combined in an

assessment programme (Chester 2003; Van der Vleuten and Schuwirth 2005). In line with Van der Vleuten and Schuwirth (2005) and Baartman et al. (2007), we view assessment as an *instructional design problem*, covering the full range of assessment methods used within a curriculum. An effective programme for assessing professional competence should be informed by professional practice in the domain of interest. Since professional practices differ across professions and settings, assessment of professional competence cannot be treated as an entity that is uniform across all educational contexts. Given this inherent variability, programmes for the assessment of professional competence depend crucially on well-informed choices made by programme designers based on their knowledge both of the profession and of assessment. Despite inter-contextual differences, developers of assessment programmes for professional competence can learn a great deal from studying existing assessment programmes. We therefore present a case from teacher training as a thick description which may be helpful to readers in their deliberations about the implementation of a programmatic approach to assessment in their own context.

The ideas presented in this chapter draw on overviews of assessment of professional competence, published mainly in the context of medical education (Van der Vleuten 1996; Van der Vleuten and Schuwirth 2005; Schuwirth and Van der Vleuten 2011; Van der Vleuten et al. 2012) but include also insights from other areas of professional practice, teaching in particular.

This chapter is written for (a) educators who are interested in assessment of professional competence, especially in relation to the development and improvement of assessment systems; and (b) administrators, supervisors and educators involved in the development of programmes for the assessment of professional competence in their own curricula.

45.2 What Is Professional Competence? Implications for Assessment

Definitions of professional competence rely on the specific requirements of the profession in question and the knowledge, skills and judgement to be mastered by professionals to be able to manage professional encounters in their field. Relevant notions regarding the assessment of professional competence will be presented in a simple and well-known model from medical education.

45.2.1 What Is Professional Competence?

Competence has long been conceptualized – implicitly – as comprising several distinct components (Van der Vleuten 1996), each to be mastered separately in monotonic process driven by learning experiences. These components were

considered to be relatively stable across situations and time, reflecting the *trait conception* which was generally supported in psychology at that time. According to the trait conception, relatively stable characteristics cause individuals to behave in certain ways (Van der Vleuten 1996), and components of competence are related to a set of latent factors within an individual, which affect performance but cannot be observed and therefore have to be inferred from observed behaviours. Between 1950 and 1980, as a result of the cognitive revolution in psychology (Baars 1986), the focus of research shifted from observable behaviours to the unobservable workings of the professional's mind. Studies investigated thought processes, decision-making and planning, conceptualizations and problem solving. Concepts of competence now also encompassed cognitive aspects, such as how professionals apply their knowledge in a particular context. It was acknowledged that professionals often have to tackle problems for which no straightforward solution is available but which require novel combinations of skills and knowledge (Andrews and Barns 1990). To deal with ill-defined problems, professionals draw on a unique knowledge base and a situational life space which enable them to exercise decision making skills (Andrews and Barns 1990; Darling-Hammond et al. 1983). In line with these insights, Kane (1992) proposed that conceptions of competence involve two major components: the domain of possible encounters within a particular area of practice which a professional needs to manage effectively, and the knowledge, skills and judgement that are prerequisite for managing those encounters. Kane's conceptualization has been embraced by various authors, including Roelofs and Sanders (2007), who defined competent teaching as:

the extent to which a teacher, as a professional, takes deliberate and appropriate decisions (based on personal knowledge, skills, conceptions, etc.), within a specific and complex professional context (students, subject matter, etc.), resulting in actions which contribute to desirable outcomes, all according to accepted professional standards. (in Bakker et al. 2011, p. 125).

According to this definition, assessment of teaching competence covers teachers' decision-making processes and actions and how these impact on student learning. Note that this definition combines cognitive reasoning by referring to deliberate decisions and actions, as well as situational awareness, by focusing on appropriate decisions and actions. In the introduction we explained that professional competence comprises general characteristics as well as specific characteristics of professional contexts, such as business organizations and educational institutions. So definitions of professional competence share commonalities and at the same time differ across professional contexts. Using a simple model of professional competence for illustration, we will discuss insights from research regarding the nature of professional competence and suitable assessment modalities.

45.2.1.1 A Simple Model for Assessing Professional Competence

The above-mentioned simple model of competence assessment was introduced by Miller in 1990 in the context of medical education. The model is visualized as a pyramid, which from the ground level upwards consists of four consecutive layers

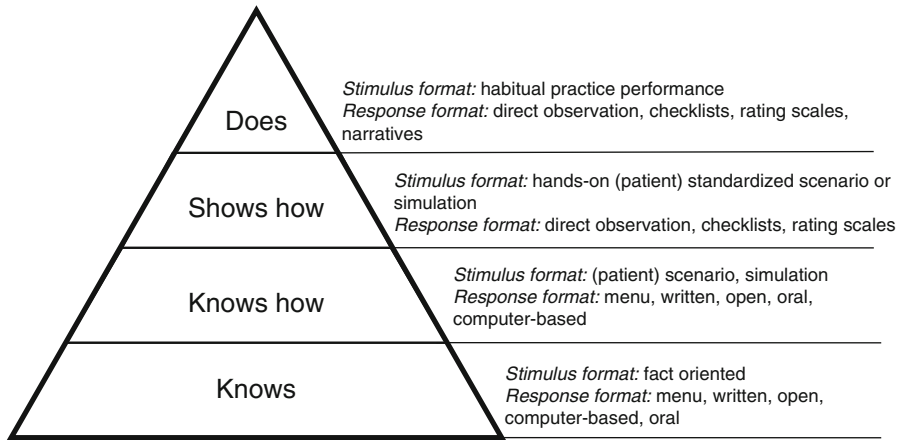


Fig. 45.1 Miller’s pyramid explained

denoting increasing competence (Fig. 45.1), with types of assessment that are particularly suited to specific layers. The bottom layer deals with factual knowledge and the next layer with knowing how to apply that knowledge, labelled as the ‘knows’ and the ‘knows how’ level, respectively. Performing all aspects of the competence of the ‘knows how’ level in a controlled simulated or laboratory environment comprises the third layer, the ‘shows how’ level. The top layer is concerned with the ‘does’ level, i.e. performance in an authentic setting in day-to-day professional practice. Miller did not design his pyramid as a pedagogical model where mastering the highest level is conditional on mastery of the lower levels, but the pyramid provides anchor points for decisions about the suitability of assessment methods for different contexts. The cognitive skills for the ‘knows’ level are mostly assessed by written, oral or computer-assisted knowledge tests, while the upper levels require concrete evidence of mastery of psychomotor, cognitive and affective components of competence, usually assessed using direct observation of performance or evaluation of products of performance.

We will refer to Miller’s pyramid in describing different methods and approaches for the assessment of professional competence. We will also show how research on the quality of these assessment methods and approaches has yielded new understandings of the nature of professional competence, which have inspired new assessment technologies and theories.

45.3 A Historical Overview of Developments in the Assessment of Professional Competence

We present an overview of developments and research related to the assessment of professional competence, ending with a summary of implications and principles of assessment, illustrating how assessment of professional competence has developed

into an enterprise involving the use of multiple methods to support feedback to guide self-directed learning as well as methods to arrive at sound judgements to support defensible and trustworthy decisions about certification and promotion.

45.3.1 *Developments in Assessment Methods*

The ‘*knows*’ level of Miller’s pyramid is related to traditional paper and pencil factual knowledge tests and tests using multiple choice questions (Van der Vleuten 1996). Gradually the realization has dawned that knowledge may equally well be assessed using open-ended questions, oral examinations and computerized tests.

The ‘*knows how*’ level requires evaluation of processes in people’s minds, such as reasoning and problem solving (i.e. procedural knowledge). It is consequently important to make a distinction between the assessment task, i.e. the *stimulus format*, and the way candidates’ responses are captured, i.e. the *response format*. A stimulus may be a written task eliciting a fact or a written case of a teaching situation inviting a candidate teacher to explain how they would deal with it, etc. Responses may be captured by a write-in, a long text (essay), an oral situation, a menu of options (multiple-choice questions), etc. An important characteristic of assessment at the ‘*knows how*’ level is that stimuli present a rich context, preferably derived from the professional domain. Such enriched tasks can be written cases, such as patient problems for medical students (McGuire and Babnott 1967) and they are intended to encourage candidates to consider the meaning of their knowledge and its application in concrete situations. The candidate’s answers and decisions serve as indicators of the candidate’s problem-solving ability. Computer techniques can be used to add realism to the assessment, e.g. by adding authentic videos and sounds.

On the ‘*shows how*’ level, evaluation techniques are aimed at simulating real-life situations in the work or educational context. A knowledgeable assessor observes the candidate’s actions and behaviours, often assisted by descriptions of adequate performance in the domain, based on definitions of key aspects of professional functioning and indicating what is considered to be good performance (Sadler 1987, 1989). Standards are also used to define levels of professional competence, from ‘poor’ to ‘excellent’. A later development was *live* simulations, such as business simulation exercises in business education (Anderson and Lawton 1988), simulated clinical stations in medical education (Harden and Gleeson 1979) and assessment centres in teacher education (Shulman et al. 1988; Haertel 1991), with candidates completing a coherent set of tasks and activities representing key aspects of professional work. Simulation tasks for a candidate teacher may involve planning a lesson or evaluating student work. In live simulations, e.g. in assessment centres for student teachers, the level of task performance and the candidates’ rationales for their actions are used as the basis for judging their knowledge and skills (Shulman et al. 1988).

Miller’s ‘*does*’ level calls for assessment of how professionals perform their daily tasks in realistic settings. Influenced by attempts to optimize the practical relevance assessment, which started in the 1990s, assessment developers have

sought to move beyond simulations and assess the ‘*does*’ level in the real working environment. Such workplace or practice-based assessment is suitable for work placements and internships to monitor and evaluate student learning. The stimulus is the authentic context, whether work or school based, which, by definition, cannot be controlled (van der Vleuten et al. 2010). In work-based contexts, direct assessment prevails, while in school-based contexts indirect assessment methods tend to dominate. Direct assessment targets behaviour, observed either directly or in retrospect based on a candidate’s previous interactions. Common methods are direct observation, followed by oral feedback from peers, colleagues and others, such as pupils in teacher evaluation, clients in business education and training, and case discussions of videotaped patient encounters or evaluation of performance by patients in medical practice. In the management literature such assessments are referred to as performance appraisals. The dominant response format is an observation structure, such as a global rating scale often complemented with additional space for assessors’ narrative comments. Such observation structures are often implemented electronically, with communication by email or smart phone facilitating assessment and offering an attractive feedback format. 360-degree or multi-source feedback from different stakeholders within candidates’ work environment, sometimes combined with self-assessment, is a familiar example of this type of assessment. In educational settings, self-assessment and peer feedback are widespread. Indirect assessment at the ‘*does*’ level is often seen in schools or educational institutions, and may include products or artefacts resulting from activities undertaken by the learner, with evidence obtained from multiple sources over time, such as information and feedback from different sources compiled in logbooks or portfolios. Portfolios are collections of evidence for professional competence, and their popularity in higher, continuing, professional and basic education has been on the increase since the early 1990s. The first portfolio for teacher assessment was introduced in the Teacher Assessment Project at Stanford University to support assessment of teacher competence with other information besides assessment-centre grades (Shulman et al. 1988). Influenced by the movement towards more authentic and meaningful assessment, the Stanford project assessed teacher performance in different practical contexts collecting the resulting information in a teaching portfolio. The notion of a portfolio was borrowed from architects’ and artists’ portfolios, i.e. real files containing samples of designs, drawings and paintings to present to potential clients (Bird 1990). Analogous to these portfolios, a teaching portfolio contains samples of a teacher’s work collected over time across contexts (Wolf and Dietz 1998). As the information is longitudinal, the portfolio can be used to aggregate numerous samples of a candidate’s performance collected over an extended period of time. Initially used mainly summatively, portfolios are currently also used formatively, which has affected their structure and content (Van Tartwijk et al. 2007). While portfolios originally contained evidential materials with, at best, some notes indicating what the material was, where it was collected, and why it was included in the portfolio, more extensive uses for portfolios have been developed, such as stimulating reflection on personal development and planning (Mansvelder-Longayroux et al. 2007).

45.3.2 *Research Findings on the Assessment of Professional Competence*

We present findings from research into the quality of assessment of various aspects of professional competence, showing how this type of research has influenced developments in this type of assessment by educating assessment developers about aspects like assessment tasks, assessor training and obtaining satisfactory assessment results. The findings are organized under the familiar headings of validity, reliability, generalizability and educational consequences of assessments (Van der Vleuten 1996).

45.3.2.1 Findings with Regard to Validity

Validity refers to the extent to which a measurement (test, exam) measures what it is designed to measure. Three types of validity, i.e. content, criterion and construct validity, have long been distinguished, and in the classical view are conceptualized as intrinsic properties of a test. Construct validity refers to the test score as a measure of the assessed characteristic, which should be defined in a conceptual framework. Content validity focuses on the degree to which test content and response properties are representative of the domain in question. Criterion validity refers to the degree to which test scores predict future performance and correlate with results on other tests measuring the same construct.

Research findings on criterion validity in particular have yielded interesting results. For the ‘*knows how*’ level, instruments were developed to measure candidates’ reasoning and understanding, but studies in medical education revealed a strong correlation between complex paper-based patient scenarios and simple multiple-choice questions (Ward 1982; Swanson et al. 1987). This finding was contrary to the assumption that essays measured understanding and multiple-choice questions factual knowledge. Research on construct validity showed that information on content-specific knowledge and reasoning skills was difficult to generalize to other contents. With regard to content validity, candidates’ responses to one assessment sample (question, case, situation, etc.) turned out to be poor predictors of performance on other samples, even within the same domain. This phenomenon was termed ‘content specificity’ or ‘task variability’ (Shavelson et al. 1993). These studies (Ward 1982; Swanson et al. 1987) created awareness that context and tasks, i.e. stimulus formats, had farther reaching consequences than did response formats (Van der Vleuten 1996). This insight made assessment developers realize that assessment tasks should present a faithful representation of the real workplace. This is in line with arguments from the ‘authenticity movement’ (Wiggins 1989; Cumming and Maxwell 1999), which promoted assessment in simulated or real-life authentic contexts. For the sake of authenticity, assessment tasks had to be pitched at the appropriate level of complexity, taking account of levels of cognitive functioning commensurate with a specific level of professional expertise (Van der Vleuten et al. 2010).

For the ‘*shows how*’ level, live simulations were developed to differentiate between groups of candidates of diverse levels of experience (Van der Vleuten and Swanson 1990). Unfortunately, research showed that live simulations did not always discriminate between levels of expertise. An explanation for this was provided by research on expertise development showing that novices and experts differed not only in amount of knowledge but also in how they stored, used and retrieved knowledge (Schmidt et al. 1990). Professional expertise appeared to develop as a transition from a conceptually rich and rational knowledge base (acquired through educational experiences) to a non-analytical ability to recognize and handle situations efficiently and effectively (acquired through professional experiences). Such abilities were found to be difficult to transfer to other contexts. As it became increasingly clear that assessment was context dependent, it was realized that professional competence should preferably be assessed in authentic professional practice settings. Authenticity was of the essence for generalization from the measurement setting to other settings (Kane 1992). Kane introduced so-called ‘high-fidelity tasks’ (Kane 2006) for direct measurement of certain characteristics, which seemed best suited to the ‘*does*’ level, i.e. practice-based or workplace-based assessments. Research has demonstrated that validity of this assessment depends strongly on how the assessor and the learner deal with the information that emerges from assessment, even more strongly than on the instruments used (Van der Vleuten et al. 2010). Assessors may have difficulty using scoring procedures and assessment criteria to interpret information from different contexts (Moss 1994), and candidates may strategically select information for inclusion in portfolios (Wolf and Dietz 1998). High-fidelity tasks, which are typically complex and open-ended, are hard for assessors to score (Kane 2006). This points to a need for assessors to be knowledgeable about assessment and trained to judge different sources of assessment information systematically and consistently, while candidates need to be informed about the purposes of assessments. The need for assessor training relates to reliability and generalizability, which will be discussed in the next section, while informing candidates relates to educational consequences, to which we will return later.

45.3.2.2 Findings with Regard to Reliability and Generalizability

Reliability relates to the replication of assessment results, i.e. the chance of finding different results when an assessment is repeated under the same conditions. Inter-rater reliability is often used as an indication of reliability (Dunbar et al. 1991). Traditionally, it has been assumed that assessors’ judgements are more reliable when assessors consistently use carefully defined assessment criteria, performance levels and scoring rules (Moss 1994), whereas selective observations, personal prejudices and biases were considered to be serious threats to reliability and validity of assessment (Gipps 1994; Moss 1994). Assessor training is known to have a potentially positive impact on consistent scoring (Day and Sulsky 1995; Stamoulis and Hauenstein 1993), and global ratings are associated with a slight decrease in inter-rater reliability, while more analytical checklist scores yield higher inter-rater

reliabilities (Van der Vleuten et al. 2010). Reliability can also be improved by standardizing assessment tasks, for example by selecting tasks that represent key situations for a particular competence area. Standardization of tasks is also used to achieve generalizability, i.e. whether the sample of assessment tasks is representative of the universe of assessment tasks (Kane 1992), the collection of assessment tasks out of all possible tasks that are appropriate to measure the construct at hand.

Research has produced intriguing findings concerning the reliability and generalizability of methods for assessing the ‘*shows how*’ and ‘*does*’ levels of competence, with relevance to measures for scoring and selecting assessment tasks. Research on live simulations, unexpectedly revealed that compared to analytic judgements, global holistic judgements yielded better reliabilities across different tasks in live simulations (Rothman et al. 1997; Regehr et al. 1998). Apparently, global holistic ratings made judges more sensitive to elements in candidates’ performance that were more generalizable across assessment tasks. Global ratings also resulted in scores that discriminated better between levels of expertise (Hodges et al. 1999; Norman 2005). A newer insight to emerge in relation to reliability is that it depends less on objectivity and standardization of methods and scoring procedures than on appropriate sampling of tasks and assessors (Kane 2006). When multiple assessors judge performance, threats to reliability, such as selective observation, biases and personal prejudices diminish, resulting in more accurate scoring. This implies that sampling across performances with different raters in each sample can considerably increase inter-rater reliability (Swanson 1987).

At the ‘*does*’ level reliable scoring is considered to be a serious problem (Moss 1994), due to the variability of assessments and respondent reactions. Studies in medical education, investigating how direct observation, peer evaluations and multisource feedback impact on reliability, have yielded indications for the number of observations needed for adequate reliability (Kogan et al. 2009; Lockyer 2003; Falchikov and Goldfinch 2000; Davies et al. 2008; Moonen-Van Loon et al. 2013). Usually, a sample of 8–10 direct observations is sufficient, irrespective of the type of instrument and what is being measured, except for patient ratings which need larger samples. The discovery that a feasible sample of direct observations can produce adequate results fuelled assessment developers’ enthusiasm for direct observation as a method for workplace-based assessment.

As for more indirect measures for the ‘*does*’ level, such as portfolios, it is known that assessors struggle to consistently interpret materials from a variety of sources (Moss 1994), although moderately good inter-rater reliability has been shown to be achievable (Driessen et al. 2007). Bakker et al. (2011) showed that a clear and simple scoring procedure, with global criteria and discussions among raters, was effective provided raters were well prepared. The competence to be judged was stimulating and supporting self-regulated learning of students working collaboratively on complex tasks. The scoring procedure was based on a conceptual framework and considerations of situational awareness were included in the assessment criteria, which defined teachers as competent when they provided *just enough* support to enable students to move to the next level of learning, a move students would not have made successfully without teacher support (cf. Vygotsky 1978).

The assessors were trained to interpret video fragments of teacher performance in an authentic environment and to provide evidence and arguments for their judgments in accordance with the conceptual framework. Acceptable to high levels of inter-rater agreement were found, and assessors were reasonably competent to use the assessment procedure in a reliable manner. It took a substantial amount of training time, however, before teachers could recognize evidence in the video fragments and got used to the steps of the scoring procedure. In modern conceptions of reliability, elements of qualitative research are used to bring rigour to portfolio assessment (Driessen et al. 2005). Procedural measures provide evidence of due process in performance decisions, such as a specific number of feedback cycles before a summative decision is made, involvement of an independent committee, the number of assessors judging a single portfolio, the amount of justification provided for decisions, etc. As more of these measures are implemented, decisions become more trustworthy (Van der Vleuten et al. 2010).

45.3.2.3 Findings with Regard to Educational Consequences

The currently widespread notion that it is important to consider educational consequences of assessments is probably attributable to Messick's (1989) extended notion of validity, where validity is not only a test property but where the meaning or interpretation of scores must be valid as well as should any implications of that meaning. Incorporating consequential considerations into his definition of validity Messick proposed an integrated validity framework, combining issues of content, criterion and construct validity with considerations of value implications and social consequences to determine the impact of assessment on teaching and learning. This impact is often referred to as 'consequential validity', which also covers adverse effects of assessment, such as the use of undesirable learning strategies by students. Negative effects have frequently been attributed to knowledge tests targeted at Miller's 'knows' level, because they were assumed to encourage rote learning aimed at reproducing knowledge without understanding, favouring a surface approach instead of a deep approach to learning (Biggs 1970, 1976; Entwistle and Entwistle 1970) or a reproduction-oriented learning style (Vermunt 1996) instead of a meaning-oriented learning style. Negative effects are known to be reinforced when tests are not judiciously distributed over the curriculum or compete with each other. Students may study very hard for a short time immediately before a test, and successfully reproduce the required knowledge at the test only to forget the knowledge as quickly as it was learned. Live simulations can generate meaningful information as well as enhance candidates' learning processes (Van der Vleuten and Swanson 1990), but the attending response formats can have adverse effects, as was illustrated in a study (Van Luijk et al. 1990) where students memorized detailed checklists and in their eagerness to show their 'knowledge' showed all behaviours on the list even when this was not appropriate for the situation at hand. The assessment developers quickly caught on to this phenomenon and switched to global rating scales adding to the criteria considerations of situational awareness.

For the *'does'* level evidence for the impact on learning is limited. Workplace-based assessment is used for assessment but also for its formative potential (Van der Vleuten et al. 2010). The provision of feedback to learners, in particular, gives workplace-based assessment formative value as it helps learners to steer their learning towards desired outcomes. Miller and Archer (2010) concluded that multisource or 360-degree feedback could improve performance, although personal factors, the feedback context and facilitation of feedback had a profound effect on candidates' responses to feedback. Feedback is most likely to bring about a change of performance when it is credible and accurate or when coaching is provided to help candidates identify and come to terms with their strengths and weaknesses. With regard to direct observation of procedural skills and case-based discussions, however, Miller and Archer found no evidence of improved performance concluding that further research was needed into the effects of workplace-based assessment on professional training and performance.

Research has examined the impact of more indirect methods of assessment at the *'does'* level. Driessen et al. (2007) showed that, for portfolios to successfully support learning and assessment, it is important that the goals and procedures are communicated clearly and portfolios are firmly embedded within the curriculum. Support from coaching or mentoring is prerequisite for effective support of learning. MacColgan and Blackwood (2009), however, found huge variation in types of portfolios for continuing professional development of educators and tremendous variability of terminology in portfolio research. Apparently, opinions differ regarding teaching portfolios and their uses complicating comparison of different studies on teaching portfolios. Comparisons of portfolios are also difficult because many studies report participants' perceptions without reporting measured effects on professional learning.

In recent years, there has been much research on assessment methods and procedures to promote self-directed and meaning-oriented learning. Formative assessment in particular is assumed to have a positive impact on student learning. Black and Wiliam (1998) analyzed findings from over 250 studies on formative assessment and concluded that the use of assessment outcomes to adjust learners' learning goals was a core characteristic (Black and Wiliam 1998 p. 140), i.e. evidence from formative assessment is used to give learners insight into where they stand in their learning, where they need to move and what they should do to get there (Black and Wiliam 2009). Wiliam and Thompson (2007) proposed five key strategies for formative assessment in classroom settings: (a) clarifying learning intentions and sharing criteria for success, (b) engineering effective classroom discussions, questions and learning tasks that elicit evidence of learning, (c) providing feedback that moves learners forward, (d) activating students as the owners of their own learning, and (e) activating students as instructional resources for each other.

However, implementing new modes of assessment does not automatically bring about desired changes in student learning, and various factors mediate the effects of new learning environments on student learning (e.g. Struyven et al. 2006). It is also a formidable challenge to deflect students' approaches to learning into a more desirable direction in a sustained way (e.g., Gijbels et al. 2008). Broekkamp and Van Hout-Wolters (2007) developed a theoretical model of factors which seem

relevant to adjusting learning strategies used by students to prepare for tests. This model may enhance our understanding of the different conditions and their interactions in this process. Based on ideas about strategy adaptation (Schunn and Reder 1998; Luwel et al. 2005) the model draws on considerations of teachers’ test demands, students’ perceptions of these demands, students’ personal learning goals and students’ ability to adjust and implement strategies. The framework acknowledges that strategy adaptation involves adaptation of external task characteristics, such as the environment where a task is undertaken, and internal task processes, such as students’ ability to adjust learning strategies, their perceptions of task demands and the task disposition. Different results were found in a review of studies on adaptation of strategies for test preparation which varied across disciplines and between experimental and authentic study designs (Broekkamp and Van Hout-Wolters 2007). Although this should not be surprising, it underlines the relevance of their model and the need to systematically investigate factors that influence strategy adaptation in test preparation, both in experimental and authentic settings.

45.3.3 Summary of Implications

As we have shown, research into the quality of methods to assess professional competence has provided researchers and assessment developers with new insights with regard to the nature of professional competence and its assessment. We summarize the implications along the lines of a number of dimensions proposed by Segers (2004) (Fig. 45.2).

The first dimension refers to the change from decontextualized, atomized tests to authentic, contextualized assessment modes underpinned by insights that competence does not rely on generic, stable, independent traits but is context specific,

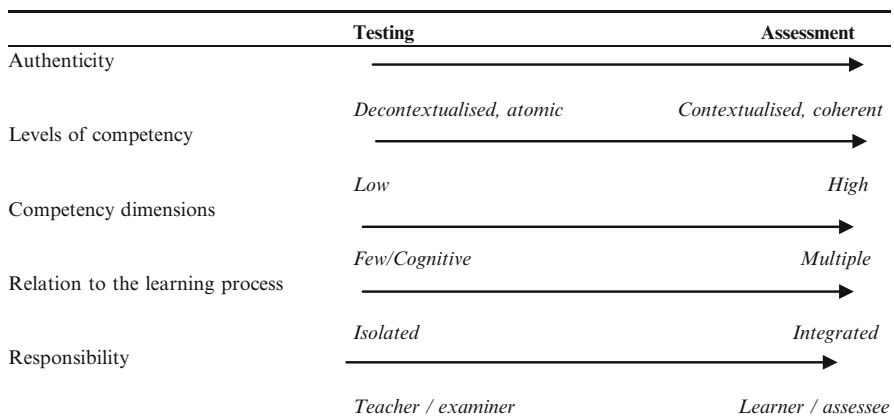


Fig. 45.2 Assessment characteristics and the differences between testing and assessment procedures as derived from Segers (2004, p. 9)

implying that account must be taken of the assessment context (Birenbaum 2003). Also large samples were needed for reliable and generalizable inferences about professional competence and information from various sources should be combined across content and time in order to gain a rich and multifaceted picture of a candidate's competence.

The second dimension is concerned with approaches to learning and professional development that emphasize lifelong learning (Atkins 1995; Eraut 1994). This involves the capturing of competency profiles that portray common patterns in the development of professional expertise using multiple methods and measurements over a prolonged period of time. This dimension is inspired by the insight that simulations may have shortcomings in differentiating between learners with different levels of expertise and can generate information that is difficult to generalize across contexts. To differentiate between expertise levels, assessment tasks should address levels of cognitive functioning that are representative of a certain level of professional expertise (Van der Vleuten et al. 2010), while scoring procedures should help assessors to distinguish levels of expertise, ranging from novice to expert. Assessment tasks and reference levels should support the development of professional expertise by capitalizing on self-directed and meaning-orientated learning.

The third dimension focuses on the multidimensionality of competencies including situational awareness as opposed to only knowledge and cognitive skills. Since assessment has evolved into a process where candidates show their competence in simulated or authentic contexts, assessment focuses on what candidates are able to and on actual performance in professional practice. This means that assessors should be able to determine to which extent candidates are responsive to what is appropriate in certain circumstances. This necessitates the inclusion of considerations of situational awareness in assessment criteria and preparation of assessors for working with these criteria, but on the other hand it leads to the acknowledgment that expert assessors are often already sensitive to these considerations.

The fourth dimension stresses the interconnectedness of assessment and learning, i.e. the notion that assessment drives learning (Longhurst and Norton 1997) implying that learning process and outcomes must be assessed in a relevant context (Dierick and Dochy 2001). It underscores the formative function of assessment, with feedback as a crucial factor (Sadler 1989), and requires monitoring of the impact of assessment on learning (Messick 1989). Recently, it has been proposed that assessment can and should be used strategically in assessment programmes to promote effective learning strategies and results (Van der Vleuten et al. 2010).

Finally, the fifth dimension relates to the responsibility for assessment, with a shift from control by examiners to assessee involvement in line with calls for learner participation in current views on learning (Birenbaum 2003). Assessee involvement is evident in the selection of items for inclusion in portfolios, but it can also be realized in 'tripartite meetings' where supervisor, assessor and student discuss the student's portfolio and the student submit additional information (e.g., Webb et al. 2003). Assesseees can also be involved in the development and use of assessment criteria, such as in peer assessment (Sluijsmans et al. 2003). Negotiated assessment is an approach

that is particularly useful for promoting learning because of its participative and interactive elements (Gosling 2000; Boud 1992). It is characterized by extensive involvement of candidates in their own assessment and by an exchange of views between assessee and assessor, who are encouraged to negotiate and agree on the feedback provided and on the use of the assessment mechanism and criteria in light of learning objectives, activities and outcomes, based on the assumption that negotiations increase learner involvement and consequently enhance learning (Anderson et al. 1996). Assessors are expected to challenge learners who are reluctant to assume this active role (Anderson et al. 1996; De Eça 2005). Further research is needed, however, to determine its impact on learning (Verberg et al. 2013). In Table 45.1, along the lines of the dimensions we described and based on developments in assessment during recent decades, we summarize principles for the assessment of professional competence and its implications.

In the next section we will describe the move towards a programmatic approach to the assessment of professional competence.

Table 45.1 Research-based principles of assessment of professional competence

Dimension	Principle	(Practical) implications
(1) From decontextualized, atomized testing to authentic, contextualized assessments	Authenticity is key since competence is context specific (not generic)	Assessments should sample knowledge, skills and dispositions as used by professionals in professional practice Large samples to allow for reliable and generalizable inferences about candidates' competence Combinations of different assessment methods across content, time and assessment sources Assessment at 'does' level is reliable with 8–10 observations (by supervisor, peer, or multisource feedback); various stakeholders determine what candidates should know and be able to do Assessment tasks reflect the authentic context
(2) From low to high levels of competence	To distinguish different levels of development of professional competence, from novice to expert performance	Valid assessment requires tasks tailored to appropriate levels of complexity Reliable judgement requires appropriate scoring procedures and well-defined performance levels Valid results rely more on appropriate assessment tasks than on appropriate scoring procedures

(continued)

Table 45.1 (continued)

Dimension	Principle	(Practical) implications
(3) From cognitive dimensions of competency to multidimensional competency profiles	Professional competence requires situational awareness	Sensitivity of candidates and assessors to candidate's interactive cognitions and situational awareness relating to real situations in authentic contexts Aggregation of information from sources that are meaningfully similar (triangulation)
(4) From isolated tests to integration of assessment and learning	Assessment drives learning and can be used strategically as a learning tool	Combination of formative and summative functions on a continuum from low to high stakes assessment Evaluation for diagnosis and progress monitoring precedes final evaluations for certification or promotion Monitoring effects of assessments on learners Evaluations based on various sources of information Evaluations provide feedback for self-directed learning Preferably no combinations of multiple conflicting roles for assessors Combined design process for curriculum and assessment
(5) From control by assessors to shared control of assessors and assessees	Active involvement of candidates and/or sharing of control by assessors and candidates since self-directed learning supports the development of professional competence, active involvement and learner control	Extensive information for learners about purposes, requirements and procedures of assessment Learners responsible for providing information from themselves and others for the assessment Validity of assessment at 'does' level depends more on how assessors and learners use information from assessments than on particular assessment instruments Assessor training in judging, giving feedback and combining information from different sources – Learners can provide information (e.g., during intermediate assessment meetings) to supplement results of (practice-based) assessments that require interpretation of information from different sources

45.4 Programmatic Assessment of Professional Competence Fit for Purpose: A Model

Given the limitations of individual methods of assessment (Van der Vleuten 1996) a richer picture of a candidate's competence can be obtained by strategically combining multiple methods of assessment across content, time and assessment sources (Chester 2003; Van der Vleuten and Schuwirth 2005; Baartman et al. 2007; Van der Vleuten et al. 2012). Combining methods in an assessment programme means that modern approaches, such as live simulations, portfolios and practice-based assessment do not replace but rather supplement more traditional methods, such as knowledge tests. Careful selection of methods, formulation of rules and regulations and creating an organizational system can obtain a well-rounded picture of candidates' competence. According to Van der Vleuten and Schuwirth (2005) and Baartman et al. (2007) assessment is not a *psychometric problem* to be solved for one single method, but an *instructional design problem* encompassing the entire range of assessment methods used within the curriculum.

Fitness for purpose is the starting point for determining the quality of an assessment programme (Dijkstra et al. 2010, 2012). In a programmatic approach, all assessment purposes, including selection, monitoring and certification, are combined and optimized to maximize assessment for learning while at the same time arriving at sound decisions about learners' progress. Consequently, intermediate evaluations focused on diagnosis precede final evaluations, focused on high stakes decisions. All evaluations are based on various sources of information, and all information is aggregated to provide a sound basis for judgements, particularly for high-stakes decisions, which must be defensible (Van der Vleuten et al. 2010). Involvement of expert human judgement is considered to be imperative in assessment programmes because it is needed to judiciously combine assessment information to arrive at robust, defensible decisions at high stake moments and to tailor feedback to candidates' learning needs (Schuwirth and Van der Vleuten 2011). To counter threats to validity of scoring due to assessor-candidate relationships, assessors should be relieved from potentially compromising, multiple roles (Van der Vleuten et al. 2010). To enable high-stakes decisions based on aggregated information it is of the essence to prevent bias due to assessors having multiple roles.

In line with the notion of the integration of assessment and learning, assessment should have formative value to ensure its relevance to the learning process, and in a programmatic approach to assessment, formative and summative assessment functions are typically combined (Van der Vleuten et al. 2010). This means that assessment of competence in an authentic context should be given formative and summative weight (Van der Vleuten et al. 2010) to prevent that learners make strategic choices and do not take the assessment seriously thereby potentially trivializing the educational value of the assessment. Later in this chapter, we will elaborate on the combining of formative and summative assessment functions and some related dilemmas.

In programmatic approaches to assessment, qualitative, narrative information carries a lot of weight (Van der Vleuten et al. 2010), and assessment instruments have built-in facilities to elicit such information (e.g., space for narrative comments).

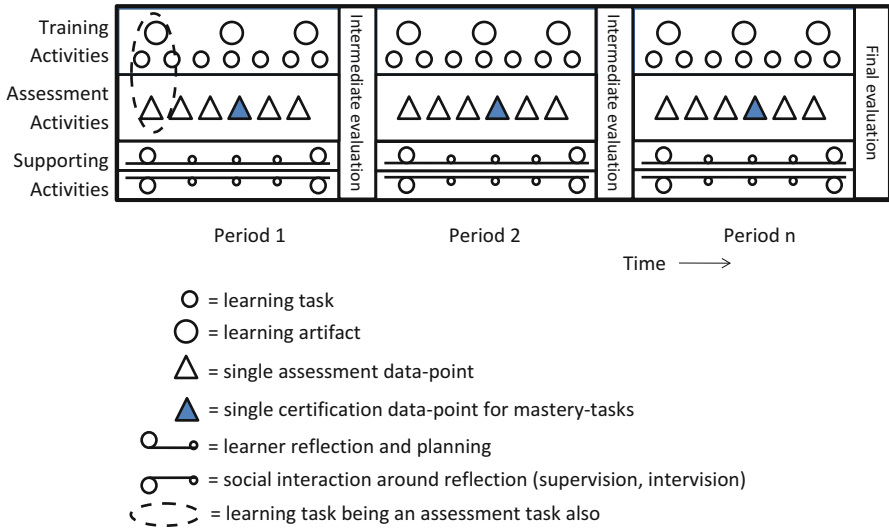
For reasons of transparency, this information has to be documented. All this has implications for assessor training: assessors should be trained to provide and document narrative feedback. Methodologies from qualitative research may support these processes (Tigelaar et al. 2005) and complement psychometric methods which are traditionally used to determine the quality of assessments. The same holds for monitoring on the programme level (Driessen et al. 2005). Later in this chapter, we will elaborate on assessment quality and related dilemmas.

Assessment programmes should be systematically evaluated for alignment with the curriculum and impact on learning, and evaluation results should be used to update the programme. Various stakeholders, including students, experts and practitioners should be involved in this process. This is important for meeting research-based and practice-based demands and expectations. However, as we will discuss later, integrating these demands in a productive way is often a struggle. In Box 45.1, we summarize the characteristics of assessment programmes.

Box 45.1 Characteristics of Assessment Programmes

An Assessment Programme...

- is grounded in a design that is based on an educational vision that supports both the curriculum and the assessment programme.
- ... links competencies and assessment instruments in an overarching structure.
- ... contains elements that produce information linked to specific courses or modules and elements that generate longitudinal information.
- ... pays systematic attention to feedback, both quantitative and qualitative, to steer self-directed learning.
- ... carefully balances formative and summative evaluations.
- ... has panels for quality control implemented by (inter-collegial) test panels and committees.
- ... is systematically evaluated with regard to alignment with the curriculum and impact on learning and uses the information from these evaluations to perform regular updates of the programme.
- ... promotes active involvement of various stakeholders (students, teachers, and administrators) in the programme.
- contains intermediate evaluations for the purpose of diagnosis or progress monitoring, preceding final evaluations for certification or promotion.
- ... draws on evaluations that are based on aggregated information from multiple sources, collected over time, and across time, content and different assessment sources.
- ...has robust procedural arrangements to promote trustworthiness of the ultimate decisions about learners.



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Fig. 45.3 A model for programmatic assessment. Reprinted from Van der Vleuten et al. 2012. A model for programmatic assessment fit for purpose. *Medical Teacher*, 34, 205-214, with permission from Informa Healthcare

Figure 45.3 visualizes a combination of different elements that may be part of an assessment programme. This model (Van der Vleuten et al. 2012) is based on the principles of assessment described in the previous section. Figure 45.3 shows that in the model we distinguish training activities, assessment activities and learner support activities as a function of the time in an ongoing curriculum. We illustrate the model with a case on teacher education.

45.4.1 Case: An Assessment Programme in Teacher Education

45.4.1.1 The Training Programme

The teacher education programme of the Leiden University Graduate School of Teaching, the Netherlands is a one year master programme aimed at training graduate students to become competent teachers. Students attend the programme full time or part time, and work as secondary school teachers, in an internship or part-time job, guided by a *school supervisor*, an experienced subject teacher specially trained for this task and a personal *university supervisor*, a lecturer who visits them at their school at least twice a year and observes them while teaching a class.

45.4.1.2 The Assessment Programme

The assessment programme addresses teaching competencies formulated in terms of teacher roles: a professional directing his/her own development, a subject teacher, a classroom manager, an adolescent psychologist, a member of the school organization and a researcher; rubrics are used to distinguish four levels of competence: poor, unsatisfactory, satisfactory and excellent. Tasks that teachers should be able to perform are described for each level.

Training/Learning Activities

Groups of student teachers and two supervisors are formed for the duration of the programme, and meet one day every week to discuss their experiences in teaching practice, (but student-supervisor conversation are also possible), attend focused courses on topics such as subject methodology, psychology of adolescents, classroom management and preparation of a research proposal. The remaining time is devoted to preparation for learning activities and assignments which may yield *artefacts of learning*, such as planning a lesson, evaluating the results, selected readings on relevant topics, constructing a sociogramme (a chart showing the natural friendship relations in a class) and administering and analyzing a questionnaire on teacher interaction (QTI, Wubbels and Levy 1991) in the students' own classrooms.

Assessment Activities

Single data points of assessment produce low-stakes information related to courses or modules, such as a video recording of a lesson followed by group discussion or artefacts, such as the analysis of a QTI. Feedback from supervisors and peers is provided in a global rating format, with comments and suggestions aimed at maximizing the impact on learning. Each data point is one element in a longitudinal array of data points.

Supporting Activities

The supporting activities focus on feedback to guide students' self-directed learning in terms of *learner reflection and planning*. Feedback on learning and assessment tasks, such as the analysis of the QTI or a video recording of a lesson, is interpreted and used to set new learning goals (Van Merriënboer and Sluijsmans 2009). To scaffold self-directed learning social interactions are arranged, such as the university supervisor asking questions to elicit reflective activities, such as describing, analyzing and planning. The student-teachers receive training for and engage in collaborative reflections with peer students.

Intermediate Evaluations

Intermediate evaluations are scheduled at the end of each module, on completion of the practical experience and in two formal assessment meetings: the go/no go assessment and the midterm evaluation. The former evaluates performance in the roles of subject specialist, classroom manager and professional, based on the student's self-evaluation and a global judgement of the university and school supervisor. The aim is *selection*, i.e. students who are considered to be unlikely to become successful teachers are told this early in the course (i.e. after 2 months) to prevent disappointment later on. Students can disregard this advice, but they are not entitled to extra support if they run into difficulties. If there is doubt about a student's prospects, a tripartite meeting is organized in which the supervisors and the student discuss the student's prospects.

The diagnostic intermediate evaluation assesses a student's progress in all roles based on: a video, which the student analyzes for classroom management, a case analysis on adolescent psychology based on the student's teaching practice and theoretical notions, a series of four lessons, analyzed for subject methodology, a case-based examination of theories of learning and instruction and their applications (written test), a self-analysis of the student's functioning in the school context, with multisource feedback (from pupils, the school supervisor, a fellow teacher of the same subject and a school leader).

Final Evaluations

The prime aim of the final assessment of student performance in the six roles is certification: has the student successfully completed the required modules and presented a complete portfolio to the assessors. The assessment can be diagnostic too, as it may involve a discussion with the student about their plans after the course. The complete portfolio contains: four lessons to be judged on subject methodology, consisting of lesson plans and assessment instruments, including a theoretical underpinning of individual lesson plans and how the lessons are connected, evaluation results of pupils, a video of a lesson, analyzed by the student with suggestions for improvement, a 5,000 word paper reporting on the student's research project, and an analysis of the student's performance in all roles, based on theoretical notions and a self-analysis of the student with multisource feedback (from pupils, the supervisor in the school, a colleague teacher of the same subject and a school leader) on the different roles. Judgements are made using (global) rating scales.

People involved in the assessment programme.

- The *supervisor is responsible for the different modules* and judges whether the student has met the demands of a specific module. The supervisors are the subject specialist and the supervisor on adolescent psychology.

- The *school supervisor and/or job coach* is co-assessor of the final assessment, and advises on intermediate and final assessments in relation to the practical assessment. The supervisor of the school where the student teachers is involved in the final assessment.
- The university *supervisor* is responsible for the go/no go-assessment, the midcourse evaluation and, together with the school supervisor, the final assessment. The university supervisor seeks further information and advice from others in making these assessments.
- The *examination committee*: in cases of disagreement about assessment between student and supervisors or between supervisors, the examination committee has the final word.

45.4.1.3 Some Evaluative Remarks on the Assessment Programme for Student Teachers

The model of programmatic assessment we have just described meets the characteristics of assessment programmes summarized in Box 45.1, but evaluations have indicated that improvements are possible. The single data points are not always clearly linked to the overarching aims of the programme while the purpose of the assignments is not always clear to students. Some students feel that self-analysis and the research assignment have no value for their development as a teacher. To maximize learning and support sound judgement processes, the assessment instruments and the way they are used for formative and summative purposes needs careful re-evaluation in light of the educational vision underlying the programme. Another area for improvement is the quality of judgements: school and university supervisors sometimes differ in their judgements of students' teaching competence. This may be due to difficulties in assessing different types of information or university and school supervisors, despite having participated in the development of the programme, disagreeing about the requirements for adequate functioning as a professional in teaching practice. Discussions with various stakeholders in the assessment programme may be necessary to determine which types of information are needed for judgements and to advance the meaningfulness of the rubrics and scoring procedures. Assessor training deserves more attention and may be improved by using concrete exemplars from professional practice.

The teacher education programme we have described is one illustration of an assessment programme. Descriptions of other assessment programmes designed according to the same model (Dannefer and Henson 2007; Driessen et al. 2012; Altahawi et al. 2012) show that designers of assessment programmes should always keep in mind that passing examinations and university tests may meet the needs of institutions but that ultimately the worth and competence of graduates is appraised in other ways and that students will use different standards to evaluate their preparation for teaching practice. This means that the link between assessment for educational and practical purposes is a crucial one. In the next section, we discuss some issues

related to that link. In the final section of this chapter, we describe additional research findings and discuss future prospects with regard to guidelines for designing assessment programmes.

45.5 Issues in the Assessment of Professional Competence

This section outlines issues with regard to linkage of assessment for educational and for practice purposes, dilemmas in combining formative and summative assessment and monitoring quality in the assessment of professional competence.

45.5.1 Linking Assessment for Educational and Practical Purposes

Issues that arise in relation to linking educational and practical purposes of assessment often revolve around incompatibility of different stakeholders' ideas about the definition of professional competence in an authentic context. Although the literature indicates that criteria and standards for professional competence should be based on empirical evidence, cooperation with practitioners on criteria and standards is also important, particularly for areas of professional competence with a relatively recent knowledge base, such as teaching (Uhlenbeck et al. 2002). Theoretical notions with regard to the acquisition of competence within a particular area need to be translated into a language that reflects the experiences and problems which professionals face in daily practice. This is important not only for fostering a sense of ownership but also, and perhaps even more so, to ensure that assessments are meaningful to daily practice and acceptable. Although professional may regard evidence-based theoretical notions as supportive to expertise development (Van Driel and Berry 2010), research also describes instances where professionals make hardly any use of theoretical notions on their own field of practice. In assessment it seems crucial that in designing assessment programmes learners' experiences and practical concerns are taken as the point of departure. An example of how this can be done, while also aiming to acquaint students with theoretical notions and evidence-based findings, can be found in a paper by Nilsson (2013) showing how research techniques can be used as formative assessment tools for developing primary science student teachers' pedagogical content knowledge (PCK) and for assisting them in becoming aware of their own PCK in relation to their own teaching. Formative assessment consisted of activities by teacher educators to stimulate interactions and self- and peer-assessment in order to provide insights into how student teachers develop their PCK during a semester. A research tool, Content Representations (CoRes), was used to unpack student teachers' approach to teaching a science topic and stimulated recall seminars using video recordings of lessons given by students were used to encourage formative

interaction between the student teachers and the teacher educator. The CoRes were used to measure student-teachers' PCK and have them reflect on their PCK, and may be seen as implicit reference levels, describing aspects of performance that need to be assessed (i.e., criteria) and portraying the student teachers' *own* development. The results of Nilsson's exploration indicate that the use of CoRes, together with subsequent self-assessment and formative interactions with teacher educators and peers were considered as relevant by the student teachers and at the same time have potential for PCK development for student teachers.

This example illustrates how theoretical notions and concepts, such as PCK development of science teachers, can be used productively to improve coherence between notions used in education and the demands of practice when it comes to adequate professional competence. Discussing findings from research with practitioners in the field may also be helpful to improve integration in this respect. Research findings can provide useful input for constructing authentic cases that provide exemplars of different levels of professional performance in relation to evidence-based standards. Such exemplars can be helpful for reaching shared understanding between assessors from educational institutes and schools who have to judge student performances, but also for making candidates sensitive to what is expected of them as professionals.

45.5.2 Combining Formative and Summative Assessment

Since it is known that assessment drives learning (Longhurst and Norton 1997), assessment processes should be designed to provide meaningful learning experiences and give candidates a fair chance of displaying their competence. However, there is the threat of undesirable interference of these two goals which may not be compatible. There may be negative backwash effects on candidates' learning processes when candidates influenced by considerations of summative assessment exclusively present their strong points (Biggs 1996, 1999). Similarly, in the context of portfolio assessment, candidates may become very selective in including items in their portfolios and in writing comments on their teaching performance. As a result the formative function of assessment is reduced since areas where improvement is needed remain underexposed to feedback and critical reflection. Nevertheless, we think that formative and summative assessments should be integrated wherever possible, and this is supported by a study showing that the ability to work towards a summative decision from the start motivated teachers to work on their portfolio (Tigelaar et al. 2006). The key issue here is that Apparently, it is not realistic to expect intrinsic motivation to offer a sufficient incentive for candidates to spend time on their portfolios and on reflecting on their teaching performance. Candidates also need to be convinced that the ultimate goals and profits make their efforts worthwhile.

The question of who is responsible for assessing a candidate's progress and providing support and feedback is another dilemma. There is a potential conflict of

interest when supervisors and mentors are required to combine the roles of guide of learning and judge of competence achievement (Tigelaar and Van Tartwijk 2010). This dilemma may be resolved by considering different assessment scenarios (Van Tartwijk et al. 2003), such as the “job-application scenario”, where the (committee) of assessors is independent and the candidates are responsible for preparing the assessment information, without any guidance or supervision. Another scenario is the “driving exam” scenario, where a supervisor helps candidates to prepare for the assessment, and an independent assessor assesses the candidate’s competence, without consulting the supervisor. Finally, in the “PhD supervisor” scenario, the supervisor helps the candidate attain the required level of competence, and decides that the collected evidence can be submitted to an assessment committee (like a professor supervising a PhD thesis). Most of the time the committee will confirm the supervisor’s decision. But if the supervisor does not do a proper job and is too lenient, the assessment committee may reach a negative conclusion.

The dilemma can also be resolved by limited involvement of coaches in the assessment of their own ‘pupils’. In order to overcome threats to the validity of scoring due to a relationship between assessor and candidate, it is argued that assessors need to be relieved from potentially compromising, multiple roles (Van der Vleuten et al. 2010). In high-stakes decisions based on aggregated information, procedures are needed to prevent bias in assessment processes caused by assessors having multiple roles. An example of such a procedure is described by Driessen et al. (2005), who argue that supervisors should not be the formal assessors of the candidates they support and guide because they are too closely involved with them. In this approach supervisors give feedback to the candidates they have guided before candidates submit their portfolio to the assessment committee, but the candidates are responsible for presenting their portfolio to the assessment committee. This is in line with constructivist views on learning and assessment, which stress learner participation and control (Birenbaum 2003; Segers 2004). The coach of the teacher who is being assessed may provide additional context information as a member of the team of assessors, which otherwise consists of other members, who are knowledgeable on teaching from different perspectives.

45.5.3 Quality in the Assessment of Professional Competence

In this section, we elaborate on methods to monitor and support assessment quality, and dilemmas inherent in this enterprise.

Earlier we discussed various psychometric criteria and we stated that assessors’ judgements are more reliable when assessors use carefully defined assessment criteria, performance levels and scoring rules in a consistent manner (Moss 1994). This may explain why assessor training can have a positive influence on the consistent application of criteria, standards and scoring rules (Day and Sulsky 1995; Stamoulis and Hauenstein 1993). A well-defined assessment framework is required from which criteria, standards and scoring roles can be derived. The framework contains

description of the constructs of professional competence to be assessed, such as surgical/procedural skills and respect for patients and other aspects of the professional competence of medical doctors (Messick 1989). Asking assessors to give rationales for their judgements (Baume et al. 2004) may help to refine the description of constructs and the criteria, standards and rules for scoring. This is consistent with our earlier argument that expert human assessors may bring additional insights to assessments which move beyond merely adhering to scoring rules and may add to the validity of the assessment. As a consequence, a more instrumental approach to defining and using assessment frameworks may be adopted, providing room for multiple perspectives on what is important in a certain area of professional competence, and putting more weight on expert human judgement (Moss 1994). In such an approach, assessment results can still be used to inform conceptualizations of professional competence and vice versa. Apart from various aspects of construct validity, other aspects of assessment quality can be considered to complement psychometric approaches to determining assessment quality, such as approaches inspired by methodologies for establishing credibility in qualitative research (Tigelaar et al. 2005; Driessen et al. 2005). Instead of focusing on standardization of scoring procedures and banning influences from assessors' idiosyncratic frames of reference, such methodologies can support the quality of scoring by stimulating assessors to give rationales for their judgements, by documenting assessment processes so that they can be made available to candidates thereby making the assessment process more meaningful for supporting learning and to enable others to check the conclusions of the assessment.

45.6 Future Prospects

This chapter ends with a number of future prospects, summarized under the headings: supporting expert judgement, developing guidelines for assessment programmes and gaining insight into underlying mechanisms that may explain the impact of assessment on learning.

45.6.1 Supporting Expert Judgement

As said earlier, expert professional judgement is imperative, especially in authentic assessment in an assessment programme. We have also argued that psychometric approaches to assessment quality should be complemented with other approaches, such as integration of assessment in instructional design and assessment methodologies based on notions from qualitative research. We need to know more about assessors' reasoning processes to prevent these methods from becoming trivialized as well. Although recent research into assessors' reasoning processes has provided valuable insights into characteristics of these processes and practical implications for supporting assessors' scoring processes (Schutz and Moss 2004; Govaerts et al. 2007, 2011;

Bakker et al. 2011), more research is needed on how expert judgement can be supported in a productive way. A balance may have to be struck between approaches that focus on standardization of assessment procedures and approaches following a more open procedure with extensive documentation of the judgement process. This holds not only for decisions on single point assessments, but even more for high-stakes decisions about selection and certification of candidates in assessment programmes. Since it is crucial for high-stakes decisions to be credible and defensible, more research is needed on appraisal of all the relevant evidence collected in an assessment programme in a sound, transparent and meaningful way. Since psychometric objectification and standardization tend to trivialize the assessment process (Van der Vleuten et al. 1991), we might look to qualitative research methodologies but also to research on naturalistic decision making (Klein 2008) and law (Simon 2004). Research on naturalistic decision making has shown that people rarely employ systematic or algorithmic strategies (Kahneman et al. 1982), but use prior experience and intuition (Dijksterhuis et al. 2006). Research in law has addressed decision-making ‘on the balance of probabilities’ or ‘beyond reasonable doubt’ (Simon 2004), showing that assessors’ mental representations shift while weighing evidence until their reasoning very strongly and coherently points in a certain direction. These theories may prove to be worthwhile for assessment programmes without placing a heavy burden on assessors.

45.6.2 Developing Guidelines for Assessment Programmes

By way of illustration, we presented an assessment programme in a graduate teacher training course. Other assessment programmes have been described in the literature (e.g., Dannefer et al. 2007; Driessen et al. 2012). The differences between programmes are partly related to what is known about professional competence in a particular field in terms of construct definitions and methods which, in a deliberate arrangement of activities, may be useful to include in an assessment programme to obtain a well-rounded picture of a candidate’s competence and to steer candidates’ learning processes. We know much more about professional competence in the context of medical education and about the development of expertise in particular domains of medical expertise than in many other domains. Another reason why assessment programmes can take different forms is determined by the context. Since the actual requirements for professional practice differ widely across circumstances, we agree with Kane (1992) that the requirements of real practice which future professionals have to meet should always be taken into account when designing an assessment programme. An assessment programme that lasts only one year may include fewer high-stakes decisions. As a consequence, measures to account for the quality of assessment decisions may be less complex. There are other aspects that may explain differences between assessment programmes and how they are constructed, but the key starting point should be the purpose of the programme. We already indicated that, although

often multiple purposes relating to selection, diagnosis and certification may be combined, it is usually one purpose that receives special emphasis (Hickey et al. 2006). We also contended that *fitness for purpose* of an assessment programme should be the starting point when determining its quality (Dijkstra et al. 2010). This implies that guidelines for building assessment programmes are best formulated generically in order to ensure applicability to various contexts. Recently, Dijkstra et al. (2012) conducted a study with a number of experts in assessment to validate fit-for-purpose guidelines for designing programmes of assessment. Their study resulted in a set of guidelines that is comprehensive and not bound to specific contexts or educational approaches. Among these guidelines are generic guiding principles focused on the importance of underpinning decisions in assessment programmes by collecting, combining and valuing information and taking concrete actions. Other guidelines point to ways to support the assessment programme and to use documentation in a productive way for improving the programme. The guidelines are formulated eclectically, which means that they rely on professional judgement for appropriate use in a particular context. Although further analysis of assessment programmes in various contexts is necessary to validate these guidelines, the available guidelines, combined with what is already known about programmes of assessment may enable assessment designers in various areas of professional education and training to monitor the complex dynamics of programmatic assessment in their own context.

45.6.3 Mechanisms Underlying the Impact of Assessment on Learning

Inspired by the insight that assessment drives learning, we have argued that assessment should be used strategically to monitor and support learning. However, we also mentioned the need for more knowledge about mechanisms underlying the impact of assessment on learning. Earlier in this chapter, we mentioned some studies that provide valuable anchor points for further research with regard to this impact. Cilliers et al. (2010, 2012) recently added to this field of research by studying such mechanisms in the context of summative assessment. They explored mechanisms underlying the impact of assessment on learning in an in-depth interview study. Mechanisms that emerged from the analysis of the results were the ways students appraise the impact of various assessment methods in a curriculum, their own learning response, their own perceptions of agency and contextual factors. Task demands, imminence of the assessment, the design of the assessment system and the cues, inferred from the assessors or the assessment tasks, that informed students on what content to learn, emerged as factors that determined the impact. Cognitive and meta-cognitive regulation activities emerged as consequences of assessment for learning (Cilliers et al. 2012). These findings are helpful for improving our understanding of the mechanisms in

assessment that drive learning. Studies, such as those by Cilliers et al. (2010, 2012) and Bennett (2011), have given an impetus to further develop theoretical models that explain this impact. This type of research should be continued to understand mechanisms in the assessment of professional competence and their impact on how future professionals learn and develop their professional competence.

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Chapter 46

Assessment of Professionals' Continuous Learning in Practice

Tara J. Fenwick

Abstract Within contemporary policy contexts of urgent demands for professional accountability, more regulatory agencies, and increased measurement of outputs, this chapter outlines issues in the assessment of learning in practice. A key focus here is conflicting purposes of assessment and views about learning. Assessment dilemmas in practice contexts include pluralist expectations, unclear evaluative authority, and contested criteria given the different epistemic cultures at stake. Competing ideologies shape the demands and measures of what comprises 'good' professional performance ensue from a range of stakeholders and knowledge sources. Struggles also unfold over the practicalities of assessing professional learning in situ. Finally, a key dilemma is reconciling the nature of practice itself with assessment of learning. Practice is largely recognized now to be a participational confluence of multiple actors and interactions, while the conventional focus for assessing professional learning still tends to be individual performance. The central difficulty is to conduct useful assessments with effective, explicit purposes that do not reduce complex practices to simplistic outcomes. Drawing from research case examples in diverse occupations such as medicine, teaching, pharmacy, accounting and nursing, this chapter critically examines current approaches to assess professional learning in practice. The discussion then turns to consider new conceptions of learning in practice from sociomaterial theories, conceptions that may help inspire new assessment approaches for the future.

Keywords Practice-based learning • Assessment of learning • Self-assessment • Sociomaterial theory

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46.1 Introduction

With the increased focus on audit and accountability, policies to mandate and measure professionals' continuous learning in practice are becoming common across occupations and regions. These policies embed a central tension. On one hand, there is often genuine desire to support professionals' lifelong learning as a dimension of the professionalism that practitioners are assumed to desire. On the other, there is real concern for ensuring consistent quality of service as well as visible accountability for this service, particularly in occupations of public service delivery such as health and social care, government and financial services, and education. The resulting proliferation of regulatory agencies and textual audit regimes does not always – if ever – promote continuous learning. Some might argue that regulatory assessment of learning is actually more a barrier than an affordance to the very activities it purports to promote. This general tension is linked to wider transitions in professionalism. Sociologists such as Evetts (2011) have shown that these embrace complex shifts from occupational to organisational control of professional practice, from public trust to suspicion, and from professions' discretionary judgments to external measures of outputs.

Within this context, this chapter focuses on common approaches used and dilemmas arising in assessing professionals' learning in settings of practice. These settings can range across work organisations and institutions, clinical and community settings, one-to-one client relationships, work-based continuing education provisions, and so forth. The entire process of assessing professional learning in practice settings is very different from that in formal education, as Yorke (2005) argues, and poses particular issues. Unlike educational institutions, practice settings tend not to have well established procedures for learning assessment, nor are they usually beholden to particular curricula and accreditation standards for learning. And although work organisations regularly assess staff performance and are able to enforce consequences for weak achievements, staff learning is another matter. Neither readily visible nor considered a primary requirement for acceptable service in most circumstances, professional learning can be treated ambivalently as valuable but not necessarily linked to specific expectations or material rewards.

Criteria used to assess learning in practice are influenced by a range of forces. These include broad regulations and standards of practice enforced by diverse regulatory bodies and government departments, as well as particular organisational goals and strategies that don't always align easily with regulatory agencies. Further, as Gannon-Leary and Carr (2010) observe in their study of UK social care workers' learning, sweeping changes to service structures and information generate struggles among both practitioners and assessors to keep criteria current.

Community norms that circulate in local work units and in professions at large also influence learning assessment criteria, and these norms are sometimes contrary to both professional regulations and organisational goals. Furthermore, as in the case of inter-professional work, there are contrasting professional criteria and perspectives at stake in assessing learning processes of a particular group. Additional complexities in learning assessment are created when practitioners are distributed across

different institutional settings, as Wiredu (2007) shows, where different cultural norms of practice and forms of control are in effect as well as institutional structures that resist learning processes. These various influences on the assessment of practice-based learning are mediated by professional associations, human resource departments, managers, and educators, each often bringing different theories and norms to the consideration of professional learning and assessment.

Given these diverse forces, it is no surprise that assessment processes are characterised by many dilemmas. These include conflicting expectations, unclear evaluative authority, and contested criteria given the different epistemic cultures at stake. There are competing ideologies shaping the demands and measures of what comprises 'good' professional performance ensuing from professional ideals, clients, employers, societal expectations, national standards and even transnational knowledge sources. Struggles also ensue over the feasibility of assessing professional learning in situ, given the time required to conduct effective assessment that is not part of everyday paid work. Finally, a key dilemma in assessing professional learning in practice is reconciling the nature of practice itself with assessment of learning. Practice is largely recognised now to be a participational confluence of multiple actors and interactions, while the conventional focus for assessing professional learning still tends to be individual performance of skills and knowledge.

These are the issues explored in this chapter. The discussion begins with an overview of purposes, principles and common problems in assessing professional learning in practice. The second section turns to examine particular approaches commonly used in assessment, drawing specific examples from professions of teaching, pharmacy and accounting to illustrate dilemmas and how these have been addressed. Section three presents some critical considerations about these approaches, arguing that there are key limitations shared across these approaches stemming from a problematic view of learning as individualistic and acquisitive, and problematic conflicting assumptions about the nature and role of assessment. The final section argues that new approaches might fruitfully arise from a consideration of various sociomaterial and practice understandings of work and knowledge (e.g. Fenwick et al. 2011; Gherardi 2009; Nicolini et al. 2003; Feldman and Orlikowski 2011). This section suggests approaches and questions that might be asked to attune professional learning assessment to entanglements of practice and knowing, as well as to its own activity within these entanglements. The argument here is that our predominant conceptions guiding learning assessment often fail to recognise how these aspects of practice and knowing are distributed, emergent, and rooted in material as well as social connections.

46.2 Starting with *Why*: Purposes, Principles and Problems

The question of *how* to assess learning in practice cannot be considered before understanding *why* such assessment is going to be conducted. Practice itself is not necessarily good or bad. Learning how to reproduce what may be problematic can be the unintended consequence of professionals' continuous learning. Yet, determining

what is good or bad practice, or where are the weaknesses that need to be corrected through learning, is far from straightforward. In any given setting of practice, different understandings of just what comprises professional learning and what sort of learning is most desirable are likely to be operating. Skår (2010) for example showed, in a study of nurses describing their work as a learning environment, that what and when they learned was influenced by the regulation of their participation in activities and interpersonal relations. Regulation can range from understanding learning as improved practice, according to particular normative claims about what constitutes effective practice, to learning as collective professional solidarity exercised through critically questioning these norms and conditions. But professional learning also can be understood as negotiating identity, or as managing transitions effectively, or as producing innovation. Whether or not these and many other common forms and purposes of professional learning are occurring simultaneously, it would be next to impossible to assess them simultaneously. An

Continuous learning among professionals is promoted for diverse purposes that are often in conflict. For example as Friedman and Philips (2004) point out, professional associations tend to view continuous professional learning as a means of gaining individual career security and personal development at the same time as verifying competence, assuring the public, and creating an adaptable workforce. Beyond professional associations, other stakeholders might include clients and service users, employing organisations, policy-makers and regulators, higher education institutions, the broader public, and individual practitioners. These diverse groups are likely to hold particular purposes for both desiring professional learning and for assessing it, with conflicting claims for authority in asserting their purposes.

This returns us to the context outlined at the beginning of this chapter. The purposes and measures of practice and learning are shifting from professional associations to employing organisations, and from individual practitioners to supervisory bodies, with increasing pressure from external regulatory agencies (Evetts 2009). A critical examination of these shifts lies beyond the scope of the present discussion. However they indicate the importance of analysing the contested economies embedded in assertions about learning purposes, and the political negotiations through which some purposes become naturalised as inevitable and important, while others can be rendered trivial or even invisible. Below are examined some common purposes for assessing professional learning in practice.

46.2.1 Comparing Instances of Practitioners' Performance to Standards for Practice

This comparison tends to be conducted to provide information to practitioners themselves for their own future learning, or to supervisors for allocating resources to support learning. What needs to be clear is what standards, exactly, are in operation, what indicators of performance *in practice* are being used to signify standards,

and how these indicators are being assessed to account for the messy dynamics of collective action in any moment of practice. A key problem occurs whenever practitioners' performance is observed and assessed externally according to pre-determined criteria. No observer can apprehend the many unseen forces at play in a moment of professional practice that influence practitioners' choices for action. In any case the observer's presence changes the relations (actors, knowledge and objects) of the practice context. For example, health care professionals such as pharmacists may be observed in their responses to 'patients' who are actually professional actors hired to present particular symptoms. The pharmacists' diagnosis can be compared to experts' diagnoses to determine frequency of errors. But the problem is that the expert answers are produced in isolated settings of reflective deliberation, without the contextual contingencies affecting the pharmacists' performance (simultaneous demands, precedent priorities, resources, or perhaps even a pharmacist's detection that the symptoms are a pretence).

46.2.2 Motivating and/or Monitoring Practitioners' Ongoing Learning

Some assessment activities are designed to recognise professional learning as an important process, and to compel professionals to record their learning regularly as a way to motivate the practice of continuous learning, and to monitor its goals and content. This purpose is often embedded in requirements for professionals to keep learning logs, reflective portfolios, or professional development plans with learning goals. The information might be intended for practitioners' sole use, for example to stimulate their own reflection on learning or to help them to track their learning activities over time, or it may be used towards licensure and certification purposes (this issue is discussed in more detail further on). One example by Wiredu (2007) examined what happened when peri-operative practitioners, a new professional group, were taught to use a special PDA (personal digital assistant) application to mobilise and assess their ongoing learning. The educator and practitioners interacted throughout their everyday work: they shared experiences among themselves in situ using the PDA, and he added questions to solicit their problems and concerns about their learning.

46.2.3 Developing Practitioners' Capacity to Assess Their Own Learning

A related purpose for assessment, often using tools such as development plans, is to promote professionals' habits and strategies to continually assess the learning of their colleagues and their communit(ies) of practice, as well as of themselves. To be

effective such assessment would prompt practitioners' critical considerations of core issues such as the different forms of knowing at play in their field of practice, the sorts of criteria that might legitimately be invoked to assess the movements of this knowledge, the problems of observing performance and trying to infer changes in learning, and the precise aims and focus for assessing learning. However, as Beausaert et al. (2011) point out, personal development plans are implemented for various purposes beyond their putative aim of promoting learning: including organisational accountability, selection and promotion. These researchers found that only when such development plans were introduced and used explicitly for promoting learning did professionals actually treat them seriously as learning tools.

46.2.4 Evaluating the Outcomes and/or Process of a Change Implementation Involving Learning

Change implementations involving professionals may include things like introducing new protocols for practice (such as a system to reduce patient falls in a hospital), new technologies, new staff programmes such as mentorship, or restructured work arrangements. Or, the implementation might be some provision of continuing professional development (CPD) itself to promote ongoing learning. Such implementations usually include learning activities ranging from training sessions, online simulations, web-based videos etc. to regular meetings developing a practitioner-led enquiry into some work-related issue. Measuring the overall outcomes of a resulting change in practice is often attempted through establishing a 'baseline' of the state of things prior to the implementation, then comparing this to a set of measures conducted at the conclusion performance observation, practitioners' reports (their perceptions of the outcomes), and organisational indicators (e.g. changes in frequency of patient falls). But these measures say little about the *learning* outcomes of any particular activity, given the many intersecting influences on changes in practice that extend far beyond learning and even beyond the human actors. Furthermore, they rest on evidence that is shaped by factors that may not be readily visible. For example, in Gilmore's (2008) study of a hospital training implementation to reduce patient falls, she found that staff had become reluctant to record patient falls to avoid consequences of punishment. The assessment showed a decrease in frequency of falls, but it had more to do with staff learning ways of working around the audit system than with learning better practices of patient fall prevention.

Even more difficult is assessing the *process* of learning involved in these change implementations. This tends to involve either sampling different aspects of the change process at different stages through written, visual or digital notes, and/or undertaking a summative assessment that might gather participant narratives and even artefacts (meeting minutes, daily logs, photos of changing spaces etc.) offering insight into participants' experiences of the learning process. Again, a key problem is how to understand the learning process within the complex dynamics of the continually changing environment, objects, and relationships of practice.

46.2.5 Assessing the Developmental Opportunities of a Particular Practice Environment

Increasingly, the materials and environments of professional practice are acknowledged to be vitally important in learning. These include tools, activity structures, organisational history, cultural rules and routines of the community of practice, new task opportunities and informational resources (Fuller and Unwin 2004). Therefore, one logical purpose of assessment would be to understand the extent to which a given setting of practice functions, materially and culturally, as a learning environment. Obviously, too, such assessment would also seek to explore the diverse ways practitioners engage these opportunities, and with what consequences to practice. More critically, the assessment would examine the sorts of professional knowledge and identities that are produced or at least affected by the dynamics of a particular setting. Information provided by such assessment might be used to highlight barriers, improve the setting's affordances and their equity of access, or develop more supportive supervisory approaches

46.2.6 Assessing the Assessment Approaches

Most good assessments build in systematic monitoring of their own processes to satisfy two main criteria: does the assessment approach produce the information that it needs to satisfy its original purpose, and is the assessment robust and valid in its methods of producing this information. Assessment activities can even create felicitous unintended consequences that may be captured in a meta-assessment to illuminate further issues about practice and learning. But without a systematic and precise monitoring of what is intended and what is actually being produced, assessments for learning can be misinterpreted, subverted, ignored, or diminished to the point of producing little more than the appearance of something useful.

46.2.7 Providing Information for Other Stakeholders

In some cases, assessment of professionals' learning is driven primarily by external stakeholders such as employers, government, or clients (Gilmore 2008). Obviously professionals' *practice* is subjected to increasing audit by such stakeholders for purposes of ensuring quality standards, justifying public expenditure on professional services, and reassuring public confidence in professionals' competence and trustworthiness. But professionals' *learning* also can be assessed to provide information to such stakeholders. Learning goals reported on professionals' plans can be tabulated and cross-linked to senior managers' system-wide goals. Practitioners' participation in learning activities can be counted and assessed when examining a practice reform or implementation of technology. Practitioners' usage of organisational

resources for learning, and the consequences to practice, can be assessed for investment decisions in further resources.

Each of these apparent purposes for conducting an assessment can be underpinned by different and often conflicting broader purposes for professional learning in work, which may be oriented more to the benefit of an employing organisation, a profession's agendas, a government's policy priorities, or individual practitioner's well being. The contradictions that sometimes result, and the politics through which these competing claims become negotiated, have been long debated in critical workplace learning literature (*inter alia*, Fenwick 2001; Stewart et al. 2007). It bears emphasising that all genuine attempts to assess learning need to be precise about three things: (1) what comprises (desirable) learning among particular professionals in particular settings, according to whose interests; (2) the precise purposes and priorities for assessing professional learning; and (3) the primary audiences and intended benefits for the information resulting from the assessment. Not all purposes are educative, or focused on the benefits of learning to practitioners themselves, such as their well-being, their development, and their own professional goals.

These questions about purpose raise an additional central issue: that of the educator's role in the assessment. In educational provision such as university-based professional training, assessment of learning is usually driven by educators and linked closely to curricular goals, pedagogies, and students' engagement in learning activities. An educative purpose is assumed. However in practice-based learning, an educator may not be conducting or even consulting on the assessment. Here we can turn to writings from lifelong learning studies which have identified characteristics of good educative assessment that can apply to settings of work practice. The following list is drawn from recommendations suggested by a range of commentators (Boud and associates 2010; Brookfield 1995; Fenwick and Parsons 2000; Gravells 2009; Svensson et al. 2009).

1. *Effective assessment of learning is ongoing, process-oriented, and participative*, throughout a particular period but also integrated as a natural part of everyday practice. Practitioners should be involved collaboratively with workplace supervisors, educators/programme designers and evaluators where appropriate, not only developing criteria and terms of the learning assessment, but also determining its methods and timing. This is what House and Howe (1999) describe as deliberative democratic evaluation.
2. *Effective assessment of learning is valid and reliable*. Evaluative activity is valid if it measures what it is supposed to measure, and reliable if it measures the same information consistently. The problem is that too many instruments designed to 'measure' individual and group learning fail to consider the complexity of learning processes and their contextual situatedness. For instance, many instruments used to assess people's learning styles have been found to be unreliable because people interpret the terms and answer the instrument's questions differently according to particular practice situations. This is why effective practice-based learning assessment tends to draw upon approaches in qualitative research that help ensure trustworthiness, such as checking interpretations with participants,

insuring information is collected over a sufficient period of time, and encouraging reflexivity of all actors involved. One example is offered by Brockbank and McGill (2007) in their model of assessing professional learning through reflective dialogue. They suggest that evidence be established that shows learners' participation in dialogue, a developmental process over time, and a process review enabling the learning to have long term duration.

3. *Effective assessment of learning is cyclical and comprehensive*, involving feedback and discussion in an iterative process. Collection of data to be used in assessment, and its analysis, is planned and conducted collaboratively through discussions that will need to negotiate the different and sometimes conflicting priorities, and meanings of participants. Feedback occurs throughout the process, to compare interpretations and suggest new approaches to assessment and practice with which to experiment. Conclusions are also subject to continuing dialogue to validate, question, and expand what occurs. The assessment needs also to account for critical dynamics that are influencing practice-based learning: organisational culture, management support, other pressures and demands, conflicting logics of practice, reward systems, policy changes and so forth.
4. *Effective assessment of learning uses a variety of methods*, because each approach both highlights and obscures certain aspects. Methods need to be feasible, but also well-suited to the working styles and forms of knowledge circulating amongst particular practitioners. Too often evaluators have emphasised the importance of practitioners' written reflections, even in settings where practitioners protest that they dislike writing and don't believe that it adequately captures their learning. Depending on their appropriateness for the setting, both quantitative and qualitative information can be collected using methods such as these, and presented to practitioners for discussion:
 - frequency of key events and behavioral occurrences,
 - concrete indicators of organisational change,
 - service user surveys,
 - practitioners' own anecdotes and self-reports,
 - peer reports,
 - presentations at meetings,
 - photographs or videos of processes in action,
 - visual or digital narratives of experience recorded by practitioners (e.g. Gubrium 2009),
 - reflective dialogue (e.g. Pilkington 2011),
 - experience samples where mobile smartphones or digital tablets are used by practitioners throughout a particular period to capture everyday moments of joint action (e.g. Büscher et al. 2011).

5. *Effective assessment of learning is communicated* through all parts of the process. This begins with communicating the specific purposes for assessment, which may or may not be negotiable with practitioners. The timing, methods and criteria to be used in the assessment also need to be worked through in dialogue, which means a focus not on delivering information but on clarifying and then

negotiating different perspectives. All results of the assessment and any follow up action also will be clearly and fairly communicated. An example is the ‘clinical supervision model’ (inter alia, Garman 1990) that became commonly used in assessing the learning and practice of school teachers. In dialogues held before and after an observation the practitioner and observer share their perspectives of key aspects of the setting and actors, ways of interpreting the action, rationale for decisions, criteria for judgement, and effectiveness of the consequences. The point is to generate questions for practitioners’ own further experimentation.

6. *Effective assessment of learning generates more learning*, both among individual practitioners and the collective unit of practice. Ellström (2010: 120) writes about ‘learning evaluation’ as promoting both ‘developmental’ learning (innovating or improving knowledge and practice) and ‘adaptive’ learning (mastering and consolidating knowledge). This occurs, he argues, when assessment is collaborative, ongoing, and cyclical. In the slightly different approach drawing from the activity-theory based Developmental Work Research method (Daniels et al. 2010; Engeström 2007), the further learning is focused on expanding a group’s object of practice, the ‘problem space’ upon which their practice focuses. This emerges from various activities conducted with the group to assess the actual routines, tools, division of labour, perspectives, community relations, history etc. comprising their practice, and together confronting and trying to shift issues such as contradictions and boundaries.

These principles, like most prescriptions, tend to hover bloodlessly at the level of the ideal and the imagined. Obviously in everyday practice there is more complexity. Feasibility of conducting multi-faceted and process-oriented assessments of learning in practice presents major challenges. These include available resources including time, training of facilitators or assessors, engagement and attitudes of practitioners, reliability of written forms of ‘evidence’, alignment between the logic, culture and rhythms of particular professional practices with the forms of assessment, and so forth. More fundamentally, these principles are focused on the educational interests of practitioners which may not necessarily reflect the interests of employing organisations, regulatory agencies, policy-makers, or investors in training. They may not even address fundamental concerns of the public for consistent quality and accountability in professional practice. That is, without clear purpose and criteria for learning in practice, the *why* and the *what* of learning as discussed in the previous section, educative principles for assessment are meaningless. Let us turn now to some extended examples to explore these complexities in action.

46.3 Turning to *What Happens*: Examples of Professional Learning Assessment in Action

In the past two decades, assessment of professionals’ learning in practice has turned increasingly towards self-assessment approaches, often based on individual reflection. Reflective portfolios, growth plans, learning logs and the like have become common

models used for regulatory as well as developmental purposes in a range of professions in health, education and social service (e.g. Austin et al. 2008; Guskey 2000; Imogen et al. 1999; Weddle et al. 2002). The following examples are drawn from research conducted in 2002–2008 examining the implementation of these assessment approaches in three professions: teaching, pharmacy, and accounting. In each story here, the relevant professional association implemented a policy to mandate and then monitor professional learning using approaches of professional growth plans, self-assessment checklists, and learning event logs. These approaches at first glance appear to fulfill many of the principles discussed above: that is, they are ongoing and participative, cyclical, capable of embracing multiple methods of data capture, communicative, and oriented to generating further learning. Each initiative adopted a different approach, with its own advantages and disadvantages. However as the brief discussion following these three examples will show, these assessment methods share certain problematic assumptions about learning processes and knowledge that need to be examined more critically.

46.3.1 Professional Growth Plans

Individual professional plans for learning or development, usually created in conjunction with a supervisor, are becoming prevalent in various sectors as a way to promote practitioners' reflection on practice as well as strategy in identifying their own learning objectives and directions (Beausaert et al. 2011; Weddle et al. 2002). A specific example offered for discussion here comes from education. To ensure the continuous lifelong learning of its public school teachers, a province in Canada implemented 'teacher professional growth plans' (TPGP) to assess teachers' continuous learning. The mandatory TPGP had to contain at least three goals and an action plan for professional development, reviewed annually with a supervisor to examine how the plan met the goals in terms of teacher learning (Alberta Learning 1998). The initiative appeared to support all the good things that teacher development literature has been advocating: reflective practice, explicit valuing of teachers' learning, and a positive model of teachers as responsible, self-directed learners. Any public concerns about accountability or teacher quality could be answered by pointing to the existence of annual written records maintained by every teacher reporting areas of practice requiring improvement and describing specific actions taken to address these areas.

In a qualitative study examining how these growth plans were used (Fenwick 2003, 2004), teachers reported an increase in their participation in specific professional development activities. Many noted a clearer purpose and focus on what was important to learn when using their own goals as a barometer, and felt affirmation in the written evidence of their own skill changes: 'You get lost in your everyday stuff and not realise how much you do accomplish in a year ... success is often very small and it takes an extreme length of time before you see a real change. [The TPGP] gives you concrete examples of what you have accomplished' (Fenwick 2003). In some schools TPGPs were used as a stimulus for gathering teachers in

dialogue. Teachers found this new collaborative space the most valuable element of the TPGP process for sharing affirmations, strategies and dilemmas about professional practice and its representation.

The disadvantages of TPGPs were also evident in every context. All interviewees noted how time-consuming the growth plans were for both teachers and their supervisors if engaged meaningfully. Trust and risk issues were uppermost as teachers positioned themselves carefully in what professional ‘weaknesses’ or ‘growth areas’ they would reveal to a supervisor as a learning goal. Some were concerned about the emphasis on potentially reductionist visible outcomes; others used this for easy subversion, writing down a few technical goals that the district valued that year such as learning power point software. The linear process of learning as goal-setting was problematic because teacher learning is more fluid and unpredictable than the 1-year TPGP process of plan-action-measure allows: ‘Some goals just aren’t set-able in September’ said one teacher (Fenwick 2003). Teachers and supervisors both were concerned that TPGPs focused on observable indicators, foregrounding teaching technique and educational strategies for growth (such as workshops and conferences) and overshadowing more intangible, complex processes of learning in practice. Some wondered whether written goals inhibited the spontaneity of following unforeseen opportunities. Teachers also wondered: Did I fail if my goal wasn’t completed? Is a goal ever completely finished? For administrators, there was concern about ‘what counts’ as a professional learning goal, and what were the limits of ‘appropriate’ goals for professional growth. While some liked the TPGP move away from a deficit model, others were concerned that ‘marginal’ teaching was not being addressed effectively. Several wondered how individual teachers were capable of identifying areas for improvement without external assistance.

46.3.2 Self-Assessment Checklists

In pharmacy, a new requirement of mandatory professional learning and self-assessment was implemented by Colleges of Pharmacists in many provinces in Canada, prompted by new emphases on lifelong learning, increased public concern over prescription dispensing errors, and changes to practice (such as pharmacists being granted to authority to prescribe pharmaceuticals). In one province, for example, an extensive competency profile was created and subsequently a ‘continuing competence’ procedure was implemented (Alberta College of Pharmacists 2008). This procedure offers online tools for members to complete a self-assessment, an annual rating of their level of knowledge and skill in a lengthy and detailed list of competencies, a learning plan, as well as a ‘continuing professional development learning log’. Individuals were required to complete a minimum of 15 h of annual continuing education, and record these learning activities in a log that asks for the relation of the activity to a specific approved competency. Traditional professional development consisted of text modules providing pages of instruction in specific topics such as anti-coagulation management or diabetes followed by self-administered

multiple choice tests of information recall. Supplementing these procedures was a system of on-site practice review, whereby registered pharmacists were selected at random and visited by observers who score their practice using detailed checklists.

A number of problems with this assessment system were identified by administrative personnel in both Continuing Pharmacy Education (CPE) and the College. First was the concern about relying upon self-assessment to ensure pharmacists' competency and protection of public safety. The annual submissions revealed little about the depth of thought or the accuracy of judgment exercised by individuals in considering each competency and rating their own strength of understanding. Assessments of competency lists did not capture the complexity of pharmacists' knowledge, or their knowledge-in-use through problem solving in specific contexts. Module tests ultimately relied upon test-taker's honesty. As the CPE Director noted, the exercise can easily turn into ticking a series of boxes: 'I do this, I know that...' (Dr. Terri Schindel, Director of Continuing Pharmacy Education University of Alberta, 6 Feb 2008, personal communication). A professional development course was created to help individuals understand reflective inquiry and the purposes of self-assessment, although it was suspected that most professionals who elected to take the course were already 'converts'. The challenge articulated by the College and CPE staff was how to help individual practitioners to develop awareness of their own 'blind spots' of practice, particularly in areas where they had less competency, so that they could seek out the information and resources they needed to solve a problem. This issue, documented in other contexts (Austin et al. 2008) has opened the question about whether these assessments require validation with external assessment and with demonstration of actual outcomes of work.

All of this led to the second major problem protested most often by practitioners: time. In the current period of pharmacist shortages, those in the field experience long shifts, managerial quotas, and general conditions of moment-to-moment survival that make tools of 'reflective practice' impossible for some to envision. Its protocols presented a new layer of work with doubtful utility. Furthermore, these assessment approaches emphasised individualised isolation, deficit, and codes of knowledge that neither corresponded with nor affirmed the actuality of everyday practice and its challenges. Finally, according to the CPE Director, written reflection for many pharmacists imposes a modality and structure of knowledge that does not fit their everyday dilemmas mixing pharmacology with problem-solving, diagnosing, and managerial activities.

46.3.3 Learning Event Logs

As in pharmacy, the accounting profession has undertaken a new emphasis on continuous learning (Fenwick et al. 2012). In Canada for example, a policy introduced for certified management accountants (CMAs) required all certified members to participate in a minimum of 120 h of professional learning activity over a 3-year period, with a minimum of 30 h annually towards the 120 (CMA 2000). In this policy,

the professional Association declares itself to be ‘very flexible’ in identifying a range of activities that may be declared. ‘Verifiable’ activities include conferences with receipts, presentations with slides, courses with reportable grades or certificates, while non-verifiable activities that may be reported include reading professional journals, doing web-based research, and mentoring others. Members must retain a log and evidential documentation of these activities, and submit to the association an ‘annual declaration’ indicating compliance with the policy along with their annual membership fee. The Association may ‘audit’ a member at any time to check the logs of specific activity participation. In choosing activities that the Association deems relevant to professional learning, CMAs are encouraged to use the CMA Competency Map as a guide. This map presents six ‘functional’ competencies for the professional CMA (strategic management, risk management and governance, performance management, performance measurement, financial resource management, and financial reporting) and four ‘enabling’ competencies (problem solving and decision making, leadership and group dynamics, professionalism and ethical behavior, and communication).

This model of recording learning events appears to be beneficial in signaling the value accorded to lifelong learning by the professional association, and the responsibility of its members to uphold a ‘professional standard of care’. For members, the policy offers some legitimation in designating intentional learning time in their work schedules, and may motivate their capacity to seek resources and plan learning. The problem with the model is that it cannot indicate the nature and depth of engagement in learning, or the actual outcomes of engagement in terms of personal understandings and changes to practice. The learning events are not necessarily connected in any meaningful way with the actual contexts and dilemmas of a professional’s practice. Nor does the model illuminate relative benefit of different activities in terms of professional learning, or offer recognition for learning within problems and relations of everyday practice.

46.4 Where Are We Going Wrong? Assessing the Assessments

These three approaches to assessing lifelong learning – growth plans, self-assessment checklists, and learning event logs – clearly offer benefits in recognising and encouraging professional learning in practice. However, all three approaches are rooted in concepts of learning as an individual, psychological phenomenon, a process of ‘acquiring’ and usually reflecting upon new knowledge and skills. Such approaches do not apply easily to many collective forms of work arrangements that are common in professional practice. Inter-professional teams, networked activities, organisational hierarchies, new technological mediations of work and so forth present complexities in everyday practice that are incompatible with such rational and personal assessment approaches. Furthermore, as argued in the following paragraphs, these concepts and their corresponding assessment tools can constrain

professional learning. With a general tendency to treat knowledge as acquired and individualist, they can occlude collective activity and contexts and overlook important politics in the learning and assessment process. They also tend to over-emphasise reflection, ignore central limitations of self-assessment, and lack reflexivity.

46.4.1 Constraining Knowledge as Acquired and Individualistic

Learning assessment approaches such as the three described here appear to embed an assumption of acquisition, as though knowledge is a pre-existing substance ingested by the learning individual and then transferred to practice. To view learning as limited to an individual consciousness 'acquiring' and applying new knowledge is to ignore growing evidence that knowledge is enacted and improvised within situational relations. A general turn to practice-based perspectives of workplace learning has generated wide acceptance that knowledge is embedded in everyday action, not in heads or even in bodies as dislocated skills (Feldman and Orlikowski 2011; Gherardi 2009; Hager et al. 2012). Professionals collectively construct, modify, resist, and select different meanings of knowledge within the complex dilemmas of everyday activity. Learning emerges collectively in these practices, and different workplace environments invoke particular practices, subjectivities and knowledge (Billett 2004; Fuller and Unwin 2004; Hearn and Michelson 2006).

Assessment approaches working from an assumption of individuals acquiring knowledge also adopt an a-political stance to workplace learning, simply describing what is learned without acknowledging important power relations and hierarchies that determine what learning is most valuable, what counts as skill, and what knowledge remains marginal or unnamed in particular work environments (Farrell and Fenwick 2007; Sawchuk et al. 2006). Power relations among professional disciplines and organisational sectors configure arrangements of activity and social divisions that enable some kinds of learning for some people, and constrain many others. Accounts and assessments of professional learning that are not integrated with these social, cultural and political dynamics construct knowledge and practice in problematic ways. Learning event logs, for example, separate learning from doing, knowledge-acquisition from knowledge application, and individual from collective. Even strong proponents of approaches such as professional portfolios have cautioned against the traps of using these to assess learning (Boud 1999).

46.4.2 Overemphasis on Reflection

Second, the emphasis on reflective practice upheld in assessment practices such as growth plans and learning logs relies upon individual mentalist recall and disclosure of experiences, translated as learning. While reflection has been demonstrated useful for encouraging personal sensemaking in professional learning, formal reflective

technologies such as supervised growth plans tend to overemphasise and under-theorise the role of individual reflection in professional knowledge. Experience is cast as static and sedimented, and separated from knowledge-making processes. What is foregrounded are individual mental representations of events, disembodied, static and separated from the interdependent commotion of people together in action with objects and language.

Further, what people reflect upon and report as their learning may not correspond with how they actually participate in learning events and everyday practice. For seasoned professionals, much practice functions at a tacit level beyond conscious apprehension and language. Indeed when they are asked to trace their participation, it becomes clear that this tracing is actually a narrative performance that varies according to their interest, sense of comfort, familiarity with context and participants, the tools at hand, judgment of 'worthiness' of learning, etc. Little of what is actually emerging in the everyday processes of knowledge-making in work is visible to individual participants. As Lather (2000) wrote, 'What we think we see, when we reflect on experience 'is always already distorted ... a spectacle of replication in an excess of intention' (p. 154). Growth plans, for example, were not able to demonstrate specific improvements in practice, nor to represent the connections among different teachers' learning or the multiple webs of their collective activity, environments and their learning. Growth plans also measured learning in ways that contained professional knowledge in a September-to-June box, predictable, controllable, and documentable.

46.4.3 Limitations of Self-Assessment

Third, in terms of self-assessment, abundant research particularly in the health professions has demonstrated that self-ratings are problematic (Kruger and Dunning 1999; Eva and Regehr 2007). Individuals' self-assessment bears little correlation with external assessments of those individuals. Most individuals overestimate their own performance in specific areas of practice, sometimes dramatically. The 'poorest performers' in particular tend to have difficulty discerning the difference between their practice and minimum standards of competence, even when shown examples of both. Kruger and Dunning (1999), among others, have argued that this is because low professional competence is partly due to inability to understand both what is required and the outcomes of one's own decisions and actions. That is, some professionals just cannot comprehend what they are doing wrong despite intensive assistance. On the other hand, it is difficult for anyone to develop awareness of what one does not know. Furthermore, the judgment of low competence presumes a decidable performance requirement which may allow too little range for professional variation or, indeed, deliberate resistance to particular performance requirements.

Eva and Regehr (2007) argue that the problem lies in the conceptualisation of self-assessment. Conventionally, self-assessment involves reflection removed from practice, attempting to determine one's general strengths and weaknesses overall. Instead, Regehr and Eva suggest assessments based on 'situation-specific self-awareness' (p. S82) where professionals are encouraged to observe how they approach specific

problems right in the heat of practice: where they experience uncertainty, what knowledge they seek out and where, whether they know when to defer the problem to other specialists and to slow down 'at the borders of competence' (p. S83). Overall, self-assessment in professional learning has been characterised by wide-ranging meanings, purposes and methodological problems that have raised calls for its complete reconceptualisation (Hodges et al. 2001; Ward et al. 2002).

46.4.4 *Lack of Reflexivity*

Finally, in all of these assessment technologies and indeed the whole enterprise of professional assessment, an important question lurks: who is really doing the assessment, and for what purpose? Who is looking at the growth plan or test results or learning log, and what meaning is being made of it? What knowledge is being recognised and for what purposes? What institutional, discursive and social conditions are being recognised as influencing how professionals are permitted to think and act? To what extent are learning encounters recognised to be sites of struggle in these conditions?

Assessment technologies shape how people come to think about their practice through disciplines of self-regulation and codification. The teachers in the TPGP study for example were quite clear about the dilemmas of risk posed by being compelled to pronounce and make visible certain weaknesses in their practice in order to comply with the annual standards for professional competence. More fundamentally, these technologies render dynamic and ineffable everyday activity into decidable and fixed texts, foreclosing the openings and the questions. As McWilliam (2002) points out, this constructs a limited view of what is worthwhile professional knowledge, and curtails debate on important contestations over knowledge and learning.

These issues are part of a larger debate about how to conceptualise and assess professionals' learning in ways that honor the complexities of practice and expertise. What is needed are assessment approaches that acknowledge more fully the important connectivities not just among different learning actors but also among actors and the materials, routines and architectures structuring their work; among actors and the knowledge cultures and politics of professions, organisations and academic disciplines; and among actors and the emerging collective knowing-in-practice in which they are enmeshed.

46.5 Towards New Directions for Assessing Professional Learning in Practice

Recent scholarship in work learning tends to accept that the learning process is distributed; that is, it is simultaneously both individual and collective, and that it cannot be valued apart from the practices with which it is mutually constitutive: everyday action, planning, conversation, projects, problem-solving, instruction,

reading, and online activity (Billett 2004; Bratton et al. 2003). Amidst this scholarship increasing emphasis has been accorded to material as well as social dimensions of practice, in a sociomaterial sensibility that understands the social and the material to be mutually constituted in everyday entanglements of activity (e.g. see Orlikowski 2007; Fenwick et al. 2011). Within these sociomaterial assemblages, knowledge and identities are produced as effects. Workplace practice represents a commingling of human and nonhuman entities that cannot be understood through a focus limited to social or constructivist perspectives of knowledge. Material elements such as artefacts, texts, technological infrastructures, bodies, bacteria and so forth are understood to mediate, even to configure in powerful ways, the learning that emerges through practice: in the immersive practice environments, the day to day practicing of practice, and the moments of inventing or reconfiguring practice (Gherardi 2009; Nicolini et al. 2003).

Three perspectives that each take up this sociomaterial approach in different ways and to different extents have been selected for discussion here: complexity science, cultural-historical activity theory, and actor-network theory. These are only three of a growing number of perspectives that recognise distributed knowledge production, environments and materials in professional learning. These were chosen simply because they are particularly common in educational literature and analyses of professional practice. What they share is concern for how learning emerges as individuals and objects interact to enact what appear to be contextual structures and culture, the configurations of practice, and knowledge. Each is rooted in different, often contested, positions about the nature of knowledge and activity. But their various contributions suggest fruitful openings for reconsidering processes through which learning in work adapts, expands and changes. These perspectives have proven particularly useful in understanding the complex, fragmentary, and often contradictory processes of professional learning and work in contemporary systems of their work.

What do any of these perspectives suggest for assessment practice? The discussion here must move into speculation and aspiration, as there is little evidence yet where professionals' learning assessment draws from these new approaches to researching practice. In any case, the contributions of these perspectives probably lie less in methods and techniques for conducting assessment and more in raising questions to engage a complex rethinking of practice. It may be best to consider each perspective as offering a different sensibility that can radically alter the way we view knowledge and its development. However, once we step aside from assuming that learning is an individual achievement that can be planned, or assessed through reflective processes that focus on meaning-making rather than everyday action in situated practices, we face considerable challenges. What can be assessed in ways that genuinely support professional learning? How, by whom, and for what purposes? The following paragraphs introduce these more sociomaterial approaches to understanding how practice works and how knowing emerges in sociomaterial activity, and suggest questions for assessment that might be posed within each of these sensibilities.

46.5.1 Learning as Emergence in Systems: Complexity Science

Complexity science provides one approach to understanding learning processes in a sociomaterial system such as a community of professionals (Davis and Sumara 2006; Osberg and Biesta 2007). The key theme is *emergence*, the understanding that in (complex adaptive) systems, phenomena, events, environment and actors are mutually dependent, mutually constitutive, and actually emerge together in dynamic structures. Learning is defined as expanded possibilities for action, or becoming 'capable of more sophisticated, more flexible, more creative action' (Davis and Sumara 2006).

In work organisations, people constantly influence and adjust to each other's emerging behaviours, ideas, and intentions – as well as with objects, furniture, technologies, etc. – through myriad complex interactions and fluctuations. No clear lines of causation can be traced from these interactions to their outcomes, because at any given time among all these interconnections, possibilities are present in the system that are not visible or realised. New possibilities for action are constantly emerging among these interactions. Out of these continuous and non-linear interactions emerge dynamic structures that exceed their parts. Osberg and Biesta (2007) call this 'strong emergence': conditions where the knowledge and capability that emerges is more than the sum of its parts, and therefore not predictable from the 'ground' it emerges from. Knowledge and action are understood as continuous invention and exploration, produced through relations among consciousness, identity, action and interaction, objects and structural dynamics. Knowledge or skill cannot be contained in any one element or dimension of a system, for knowledge is constantly emerging and spilling into other systems. This means that humans are fully nested within and interconnected with many elements of the systems comprising them and in which they participate. They are not autonomous, sovereign agents for whom knowledge can be acquired or extracted. Rather, they perform themselves into existence.

Complexity-informed assessment, like its research, would likely be participatory and emergent. Approaches to such assessment can be borrowed from participatory research methods, which are well-known in the field of professional development. One approach would engage professionals in framing for themselves a collective dilemma of practice, then exploring, designing, acting and tracking what emerges through their intentional intervention. Participatory assessment, in particular, would focus on collective identification of benchmarks or snapshots of practice that can be compared at different stages, flexible indicators from different perspectives to help characterise what is emerging and what count as outcomes, and language to describe processes, strategies and uncertainties. Participatory assessment also would capture and compare individuals' perceptions, assumptions and judgments about the process and its outcomes over time.

Assessment approaches therefore, following educational research approaches crafted from principles of complexity adaptive systems (David and Sumara 2006), might begin by tracking emerging patterns in a system, drawing particular attention to what occurs in the 'background': the myriad fluctuations, subtle interactions,

the series of consequences emerging from a single action. Assessment would mimic the feedback loops of complex adaptive systems, providing feedback at various points in time and within system exchanges, detecting where bottlenecks, reduction of variation, or control of information are preventing emergence. From a complexity science perspective, feedback also focuses on disturbances, amplifying those with generative potential and highlighting those with destructive potential. A key element of assessment would be attuning participants in a complex system to its diversities, emerging patterns and dynamic structures, and helping them to assess these patterns and develop a 'complexified awareness' of their own and others' impacts on the larger system (Davis and Sumara 2006). Finally complexity science would require any observer such as evaluators to also assess their own entangled involvements in the emerging systems of thought and action through the very process of assessment.

46.5.2 Learning as Expansion of Systems and Participants: Cultural-Historical Activity Theory

Cultural-historical activity theory (CHAT) is increasingly used to understand how learning and activity are embedded in the interconnections of a workplace system(s) (Fuller and Unwin 2004; Engeström 2001; Sawchuk et al. 2006). First it is important to understand that action in activity systems is shaped by its 'object', the problem at which activity is directed. The everyday action of work and learning is further shaped by the system's division of labour, community relationships, rules, tools and cultural norms, and actors' different perspectives. CHAT theorists look carefully at the system's *culture* and its *history* – how things came to be as they are, and came to be viewed in ways that they do. They also focus on the *contradictions* that all systems carry within them. For example, many professionals' work organisations carry simultaneous pressures to innovate and take risks while performing with excellence, mastery and no error. Or, professionals' organisations require collaborative, interdisciplinary work and espouse collective knowledge while rewards and structures continue to focus on the efforts and competency of the autonomous individual.

From a CHAT perspective, learning is viewed as expansion of the system's 'object' and reconfiguration of the system's practices. Further, learning combines collective expansion and innovation with individual expansion in conceptions, interactions and practices. The expansion often comes about through the successive exacerbation and resolution of contradictions within the system. For example, within an organisation that promotes collaborative work but gives most rewards to individual effort, some people might begin to seriously question the contradictions at play and their consequences. In a research-intensive university department, these questions could ultimately become directed at the overall 'object' driving their research. Is the object more to generate refereed journal publications and grants, or more to create networked relationships and to impact practice, if these two directions come into conflict? Is the object measured through visible short-term outcomes in

place of ambiguous and unpredictable long-term outcomes, even when these may be more salient to deeper-impact research? Such questions, when taken up seriously throughout the organisation, cause the object to expand and shift as individuals' understandings expand and shift. Learning thus occurs through a non-linear cycle of questioning something in this activity system, analysing its causes, modeling a new explanation or solution, implementing this model in the system, reflecting on it and consolidating it (Engeström 2001). Much back-and-forth activity revolves around finding consensus about what exactly is the problem, and what can be tolerated as a solution or innovation within the politics of the system.

In terms of assessment of professional learning, we might draw from protocols used in Developmental Work Research, which is a method of interventionist participatory research for organisational change developed among CHAT scholars (see Edwards et al. 2009). Assessment logically would begin by establishing the dynamics of tools, community, divisions of labour, and rules interacting with the professional in everyday activity. Overall, assessments might be informed by questions about how the collective object of the system is understood by different professional individuals and groups within the system. Further, where there are conflicts, problems or blocks, assessment might be directed to understand how this object(s) might expand and be reconfigured. Where are the internal contradictions held within this system (among objects, tools, divisions of labor, boundaries, etc.)? What new tensions are emerging? What internal tensions could stimulate change? (Which ones could be articulated?) What boundaries prevent expansion?

In practice, assessment of learning might begin with a group of system participants identifying a specific activity or practice where there is felt some need for change. They might collect data in the form of digital narratives of participants that capture their own everyday activities and experience, and selected artefacts and texts felt to be significant to practice or the activity system. With a facilitator, a group can analyse the traces of practice to examine issues such as these:

- What central contradictions in the system may be influencing this activity?
- Where are boundary issues and areas of tension, and what is causing these?
- What rules, tools, diverse perspectives and division of labour are evident that are important in this activity, and how do these work in everyday practice?
- How do artefacts mediate people's actions and interactions in their activity? What changes to these might improve everyday practice in directions desired by the collective?
- What is the *actual* 'object of the activity' – the central task being worked on collectively within the overall goals of the system? In what ways might this be expanded to open more productive possibilities?

The learning of the group is oriented not only in their collective assessment of their everyday practice, but in action they develop towards change and the group's dialogues. Edwards et al. (2009) suggest that these dialogues, what we might consider to be a form of assessment, focus in particular on explicitly recognising the motives and resources that others bring to bear on this object. Participants work with others to expand the object of activity – engage with their categories, values and

motives in negotiating action on this complex object. Individuals can assess and be assessed at each of these steps in terms of their learning and participation in this process, but they would do so in the context of their own role and activity within the history, culture, contradictions and mediating artefacts of the collective activity system.

46.5.3 Learning as ‘Translation’ and Mobilisation: Actor Network Theory

A third perspective that has been influential in understanding practices and change is actor network theory, whose chief proponent arguably is Bruno Latour (2005). Like complexity science, ANT is a diffuse cloud of perspectives, not one unitary conception. These perspectives suggest that any changes we might describe as learning – new ideas, innovations, changes in behavior, transformation – emerge through assemblages and spread themselves across time and space. These assemblages or networks, as well as the actors that they create, are brought into existence through myriad negotiations among humans and non-human entities. Fenwick and Edwards (2010) present a review of studies establishing the contribution of ANT to analysing practitioners’ learning within these networks. In one study using ANT, Gherardi and Nicolini (2000) examine how workers learned safety skills by tracking the negotiations of knowledge at every point as it moved through a system. For example, one workman would show another how to adapt a new safety procedure to make a task easier, or two together would adapt a particular tool to solve a problem, depending on who was watching. At other points in the system, the crew foreman negotiated the language of the safety assessment report with the industrial inspector. Deadlines and weather conditions caused different safety knowledge to be performed and different standards of evaluation. The equipment itself, and the crew’s culture, embedded or ‘grounded’ a history of use possibilities and constraints that influenced the safety skills performed by those who interacted with the equipment. No skill or knowledge had a recognizable existence outside its use within the community.

Each entity in this process becomes an actor only when it succeeds in *translating* another actor, mobilising it to perform knowledge in a particular way, such as a worker translating a foreman into a disciplinarian through a particular set of behaviors. Eventually these dynamic attempts by actors to translate one another become stabilised: the network settles into a stable process or object that maintains itself. Like a black box it appears immutable and inevitable, while concealing all the negotiations that brought it into existence. An example would be a mandated list of professional competencies, or a so-called evidence-based practice accepted as ‘gold standard’. Each entity also belongs to other networks in which it is called to act differently, taking on different shapes and capacities. A written contract, for example, is a technology that embeds knowledge, both from networks that produced it and networks that have established its use possibilities and constraints. In any employment arrangement the contract can be ignored, manipulated in various ways, or ascribed different forms of power. Thus, no agent or knowledge has an essential existence outside a given network: nothing is given in the order of things, but performs

itself into existence. 'Moments' of translation have been framed (e.g. by Callon 1986) as problematisation (where something tries to establish itself as an 'obligatory passage point' that frames an idea, intermediary or problem and related entities in particular ways); intersement (where selected separate entities are actively connected to this framing and where they negotiate their role in the emerging network); enrolment (the process whereby these entities become engaged in new identities and behaviours and increasingly 'translated' in particular directions by the network relations); and mobilisation (where the network is sufficiently durable that it can be extended to other locations and domains). As Fox (2005) explains, professional competence from an ANT perspective is not a latent attribute of any one element or individual, but a property of some actions rather than others as a network becomes enacted into being. This process of enactment, this interplay of force relations among technology, objects and changes in knowledge at every point in the network, is a continuing struggle – and this struggle is learning.

From ANT-influenced analyses of workplace knowledge, questions are posed that could guide new ways to approach assessment of professional learning. For example, how do the material objects of the practice configure professionals' action and response? Immediately the focus shifts from the individual 'learner' to the negotiations among human and nonhuman entities that enact knowledge. ANT sensibilities go on to ask: How do the networks that function as knowledge 'actors' (particular practices, standards, codified professional knowledge) emerge? What connections assemble objects and professionals into the networks that become these actors? What and who becomes included and excluded? What individual identities, behaviors have been translated in becoming part of the network? What negotiations occur as individual elements take up, resist, or compete with the attempts to enroll and mobilise them into particular patterns of action and knowledge? Working from such questions, the assessment of professional learning then becomes a process of tracing how knowledge circulates – both among humans and non-humans within particular contexts, and across institutions enmeshed in determining and regulating professionals – to enroll, mobilise and to stabilise particular practices and ideas. The approaches employed to address such questions are necessarily messy (Law 2004), and firmly resist being transformed into the tidy technical tools that evaluators might desire. But this is precisely the point. Until assessment approaches are willing to engage with the ontological dilemmas that are really at stake in the sociomaterial ways that professional practices are configured and reconfigured, and the ways that individual humans and their conceptions and what appears to be their competencies are intimately entwined in these webs, they will continue to yield little more than a reflection of themselves.

46.6 Conclusions

In attempting to sketch the different approaches and dilemmas of assessing professional learning in practice, this chapter opened by emphasising the *why* question: the purposes for assessing learning. Particularly in contemporary environments of near

oppressive scrutiny and regulation of professional practice, assessment purposes can turn learning into an exercise of compliance or subversion rather than capacity building or innovation. Even purposes intending improved performance may succeed only in ensuring practitioners' adaptation to existing problematic practices. Different assessment purposes explained earlier in this chapter are each underpinned by particular interests and audiences. They each embed different problems, and require different approaches to track, interpret and judge professionals' learning.

The chapter presented three extended examples in practice of common approaches to assessing professionals' learning. The examples were drawn from research of initiatives in teaching, pharmacy and accounting involving professional growth plans, learning event logs, and self-assessment checklists, all of which are widely used across various professions. While each initiative yielded some positive benefits in monitoring and encouraging professional learning, each also embedded fundamental problems. The chapter argued that some of these problems were related to their conception of learning as acquired and individualist, such that the assessments could not attend sufficiently to collective activity, contexts and important politics in the learning and assessment process. Furthermore such assessments tend to over-emphasise personal reflection, ignore central limitations of self-assessment, and lack reflexivity.

Towards future directions for reconsidering assessment of professional learning, the chapter contends that richer approaches might be derived from new sociomaterial perspectives that have been applied by organisational theorists to analyse knowledge, learning and change in work environments. Sociomaterial perspectives of knowledge urge a refocusing on the relations and openings *among* things, not the things themselves, to observe complex wholes emerging from improvisations among micro-elements. Three perspectives were outlined: complexity science, cultural-historical activity theory and actor network theory. Each is based on very distinct ontological commitments and assumptions about how knowledge is produced. Each can suggest different questions for assessing learning which open possibilities for considering the enmeshment of professionals' learning in the webs of collective action and cultural discourses, nodes of micro-negotiation and struggle, politics of knowledge and institutions, and systemic contradictions of their work. These questions unsettle one another and highlight their own and each other's limitations. These questions also fold the gaze of assessment back to itself. No position of observance or representation is possible outside the webs of collective action. Even or especially with all of these approaches, the purpose for assessing learning must be determined. In professional practice, where public trust is threadbare and demands for accountability are urgent, assessment purposes need to be strategic and explicit.

A well-worn caveat is that what gets measured is what gets learned. While learning is far more dynamic than this might imply, it is clear that assessment technologies as a form of representation powerfully shape practice or at least individuals' sense of what is valued in practice. Too many measures of professionals' learning are distant from practice, overly determined, reductionist, and non-reflexive about their limitations and their performative power. Under their regulation, professional knowledge as well as professional subjectivities can become truncated or misdirected.

If educators, supervisors and practitioners genuinely seek change in professionals' approach to learning, we surely must be willing to begin by seeking alternate approaches to assessment. The opportunity now is to recognise the limitations of these approaches as well as their contributions, to foreground their technologies, politics and assumptions about learning, and perhaps even to explore alternate conceptions that can shed light on knowledge emergence such as those offered by sociomaterial perspectives of practice.

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Chapter 47

The Influence of Evidence-Based Decisions by Collaborative Teacher Teams on Student Achievement

Patrick Griffin, Esther Care, Judith Crigan, Pamela Robertson, Zhonghua Zhang, and Alejandra Arratia-Martinez

Abstract This chapter provides a description of a model in which it is hypothesised that student learning is in part an outcome of a combination of teacher factors. In particular the effects of a culture in which the interpretation and use of student assessment data is used to inform differentiated teaching strategies and practices is examined. Teachers participate in professional learning activities within collaborative teams to develop their data interpretation skills, and engage in a cycle of decision making, implementation, evaluation, and review in their use of data, to enhance student learning outcomes. In examining measures of these activities, and student learning outcomes, links are inferred between teachers' activity and engagement in the group process of decision-making, their metacognitive capabilities in the context of an approach to developmental teaching and learning, and the progress of students. Test data were interpreted in a developmental assessment framework, drawing on synthesis of relevant theoretical frameworks outlined by Griffin (Stud Educ Eval 33:87–99, 2007). Mirroring teachers' levels of engagement, activity and metacognition, student gains in literacy are reported. With teachers distributed across the possible range of skills, and students similarly distributed, it is clear that not all students are progressing at equal rates, and that there is a strong trend toward the higher achieving students not progressing at the same pace as students less able, in the first instance. The probable contributing factors to this phenomenon are discussed.

Keywords Collaborative teams • Student achievement • Learning outcomes • Team engagement • Metacognition

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Increasingly, teachers are being held accountable for the learning of the students under their care and greater pressure is being placed on schools to improve student learning outcomes. In order to achieve this, teachers need to be responsive to student learning needs rather than concentrate only on curriculum imperatives. Such responsiveness is best achieved through teacher use of student assessment data. Traditionally students have been assessed in a summative way – often at the end of a teaching topic, term, or semester – to determine the extent to which each student has mastered the delivered content. This summative assessment is typically used to rank students and for reporting to stakeholders. However this type of assessment is not very helpful in improving student learning outcomes and contributes little to the planning of teaching interventions.

This chapter provides a description of a model in which it is hypothesised that student learning is in part an outcome of a combination of teacher factors. In particular the effects of a culture in which interpretation and use of student assessment data is used to inform differentiated teaching strategies and practices is examined. Teachers participate in professional learning activities within collaborative teams to develop their data interpretation skills, and engage in a cycle of decision making, implementation, evaluation, and review in their use of data, to enhance student learning outcomes. In examining measures of these activities, and student learning outcomes, links are inferred between teachers' activity and engagement in the group process of decision-making, their metacognitive capabilities in the context of an approach to developmental teaching and learning, and the progress of students.

The objective in the study reported here was to enable teachers to use data within a developmental framework to improve performance of all students. The goal was for teachers to work in a culture where evidence is challenged and discussed rather than one where there is only mutual endorsement of shared teaching strategies. They would become increasingly skilled in the theory and application of assessment, knowledgeable about the developmental nature of the construct they are teaching, and better able to link evidence of student learning readiness to targeted intervention.

Notwithstanding global emphasis on collaborative teacher planning and practice, the identity and use of phenomena such as professional learning teams varies considerably. In many cases, these teams mirror staff meetings where student progress might be reviewed but where the implications for teacher practice are ignored. For example, typically the initial part of a meeting is put aside for administrative issues (camps, dates, teacher availability), followed by focus on strategies for teaching in a whole class approach sometimes informed by data (but mainly in the form of scores). The team may also discuss students who need special support or attention. Such teams are cooperative endeavours rather than collaborative ones. Cooperation implies positive participation in an activity, while collaboration implies working together to a common and focussed goal, and bringing to the endeavour different resources – skills, knowledge, and artefacts. The Professional Learning Team approach discussed in this chapter is one in which the teams are deliberately constituted for the purpose – to focus on student learning outcomes, and where team members are self-consciously developing their own expertise.

Two models are reflected in this study, at the research level and at the teacher level respectively. The research model reflects the contention that professional development for teachers delivered within a team model has a superordinate effect on teachers' practices, their attitudes and metacognition, and on their knowledge of discipline (or subject); and that through these affective and cognitive factors, the teachers are more likely to influence student learning outcomes. The teacher model draws on these research factors in order to implement a series of steps to guide student learning. The teacher first asks what the student is ready to learn through analysis of evidence drawn from the student; then identifies appropriate strategies and interventions together with required resources; determines the expected impact on learning and how it will be evaluated; and after intervention draws together evidence of what has happened and interprets this, with a view to continuing the cycle. At each of these steps, the teacher acts within the framework of the team learning and improvement model with a focus on challenge of the teachers' own learning. This learning is tagged within the model to teacher classroom practices, attitudes, knowledge of the discipline, and their self-conscious awareness of the learning. No items outside this agenda are the business of the Professional Learning Teams.

The approach has its origins in a project with the Catholic Education Office (Melbourne) (CEOM) in Australia. In 2004 the CEOM implemented the Literacy Assessment Project (LAP), which initially involved trials of a range of reading tests in 20 schools. The project expanded to investigate how to develop teachers' use of assessment data to target intervention to improve student reading comprehension (Griffin et al. 2010). Professional Learning Teams of teachers (PLTs) engaged in collaborative discussions based on challenging peer evidence of learning and links between intervention and learning gains. Increased teacher understanding of the use of data for informed and targeted intervention was matched by student gains in reading comprehension. The scope and effect sizes of the changes in student learning were compelling (Griffin et al. 2010). Several hypotheses were formulated concerning the contributing factors to these changes, and this chapter describes the evidence that has been brought to bear on testing them.

The premise of the approach is that teachers who use a specific style of evidence-based teaching, and who operate within a developmental learning paradigm have an increased effect on student learning outcomes. How collaborative teaching teams might use data to enhance decision-making regarding teaching and learning strategies at large scale level was investigated through a study referred to as the Assessment and Learning Partnerships.

The relationship between teacher behaviour, knowledge and attitudes, with student learning is the key issue addressed. The criterion, student learning, was measured using standardised tests of reading comprehension. The effectiveness of teacher intervention was assumed to depend on teacher knowledge and understanding of how best to use assessment data to improve learning outcomes; and was measured through a variety of methods including self-report tools. An explicit program of teacher professional development in the use of assessment data was implemented and gains in teacher skills and knowledge were identified. Teachers were assisted in interpreting data and in linking their interpretation to targeted intervention in a

differentiated instruction framework model. The study contributes to a convergence of research that this is an effective practice in improving teaching and learning (Snow et al. 1998; Taylor et al. 2005).

The key concepts in this approach concern the use of assessment data as evidence of student learning, teachers working in teams to interpret these data and identify appropriate interventions, and in so doing assuming a developmental learning progression for all students. The affective and cognitive factors identified in the research model are clarified in the next sections.

47.1 Team-Based Collaborative Reflection

Critical and collaborative discussions act as an important vehicle for teachers to test their ideas about links between student progress and interventions. Team-based models are an effective form of professional development in comparison to traditional workshop models. Change in teaching practice can occur when teachers are engaged in examining their own theories of practice (Deppeler 2007). Teachers' collaborative reflections have been linked to improved student achievement (Phillips 2003) and changed teacher perceptions (Timperley and Alton-Lee 2008). Collaboration in professional learning teams enables teachers to have access to a greater number and divergence of theories to test their own against. Where the community draws on differing expertise, cultural change can be a slow and painful process (Ladson-Billings and Gomez 2001). Teams of teachers, school leaders, policy-makers and researchers appear to accelerate their learning when they are involved in rigorous examinations of teaching and learning, rather than comfortably sharing ideas (Robinson and Lai 2006). The shift from sharing to challenge is important. The process is facilitated when the discourse of challenge is based on observable evidence – what students do, say, write or make, rather than on inferences drawn from that evidence (Griffin 2007). This approach can change the discourse from a teacher-centred mode to student-based evidence.

47.2 Developmental Learning Approach

Deficit approaches to diagnosis of student learning needs focus on the things that students cannot do. In particular they take a remedial approach, especially for low achievers. In contrast, what can be termed 'developmental models' scaffold existing knowledge bases of all students. This approach is based on a belief that there are natural progressions of learning or development, which all students will follow, although they will do this at different rates. The model is focussed on readiness to learn and a generic process of developing the student. The approach is also explicit in the work of Vygotsky (1986) who viewed learning as stages in a progression of skill or knowledge acquisition. Vygotsky termed the point where the child is just mastering a skill

their *zone of proximal development* – defined as the difference between what a child has mastered and what they are able to achieve with the help of a more capable other (1978). Vygotsky believed the role of education is to provide experiences within the child's zone of proximal development, thus working on tasks that are neither redundant as the child has already mastered them, nor of little benefit as they are beyond the child's grasp. Unlike other developmental theories, such as Piaget's, which propose development is dependent on maturation, Vygotsky's provides a more empowering viewpoint – that children are able to advance with teaching, and are capable of far more competent performance when they have proper assistance from adults (Berk and Winsler 1995). Structured, temporary support at the point where the student is on the verge of achievement has been termed scaffolding, with the goal to maximise growth and lead to independent self-regulated achievement (Bruner 1960). The model is focussed on readiness to learn and a generic process of developing the student. For this approach the expertise of the teacher both in content and in developmental learning and assessment is critical (Wilson and Draney 1999).

47.3 Use of Assessment Data

Merely having and using tests is an insufficient condition to inform teaching and improve learning (Halverson et al. 2005). Accessing and interpreting the test data in an evidence-based approach to teaching and learning appears to be central. Using standardised assessments formatively requires that tests can provide sufficient information to create a profile of students' learning and to identify the zone of intervention for individual students. It also requires teachers to link their interpretation of data at both group and individual levels to teaching interventions to examine and explain any improvement in student learning. In previous research, this has been enhanced by a process of critical and collaborative analysis and discussion of data (Griffin et al. 2010). The common theme in previous studies has been that it is essential to have a process by which teachers can be engaged in interpreting the data, linking the information to their own teaching, and testing the links using the discourse of evidence and accountability among peers. At times teachers do not recognise the impact of their teaching on student achievement, but attribute outcomes to factors beyond their control such as home background. This is despite evidence that teacher/classroom effects can account for up to 60 % of the variance in student achievement (Timperley and Robinson 2001; Alton-Lee 2004).

47.4 Teamwork

For the purposes of this study the PLT was considered to be equivalent to collaborative work teams. Since the 1980s' proliferation of team-based workplaces, research has shed light on what leads to effective teams and the conditions under which team

work improves output. Sundstrom (1990) categorises four broad applications for work teams; (a) advice and involvement, (b) production and service, (c) projects and development, and (d) action and negotiation. Clearly the tasks that such work teams undertake are very different from the tasks of Professional Learning Teams which makes it difficult to generalise theoretical models or empirical research on work teams to the educational sector. Accordingly, in order to investigate the factors which contribute to the effectiveness of teams, different models need to be developed appropriate for the specific context.

Taking this into consideration, the accumulation of work team research provides a valuable framework to support the study of PLTs. When looking at team effectiveness, a common model is the input-process-output framework (McGrath 1964). In such models, inputs describe antecedent factors that may hinder or enable team interactions such as team member characteristics, (e.g. knowledge), team level factors (e.g. task structure) and contextual factors (e.g. rewards and organisational support). Processes act as mediators between inputs and outcomes, and may include more than processes emergent states such as potency, and collective affect. Given this, the framework is often referred to as input-mediator-output. The mediating factors are generally broken down into two classifications – broadly the tasks that teams undertake and the processes that are apparent in the way the team undertakes its work. Here these two aspects are referred to as *team activities* and *team engagement*.

47.4.1 Team Activity

To study any particular type of team, an in-depth understanding of the work of the team and what constitutes best practice is needed. No matter how well the team interacts or communicates, team output is dependent on the tasks the team undertakes. Study in this area encompasses looking at the *task characteristics* (Gladstein 1984; Tannenbaum et al. 1992) the *appropriateness of the task performance* (Salas et al. 1992), *the strategies employed* (Klimoski and Jones 1995; Salas et al. 1992) and *the task type, task organisation and task complexity* (Gladstein 1984; Tannenbaum et al. 1992; Hackman and Oldham 1980). Some models have also considered how aspects of the tasks affect team members' motivation. These aspects include the *task variety* which refers to breaking up monotonous tasks, *task significance* which refers to understanding the importance of the work and *task identity/task control* which refers to seeing a task through to the end product rather than working on a specific component (Campion et al. 1993; Gladstein 1984; Hackman and Oldham 1980).

To help determine what aspects of team work should be investigated in studying PLTs, the research on Professional Learning Communities (PLCs) has identified particular ways that PLCs work which lead to effectiveness. Successful PLTs or PLCs have two areas of focus – teacher learning and student learning. Newmann and Wehlage (1996) identified five essential characteristics of successful PLCs:

- Shared values and norms regarding children's ability to learn and the responsibilities of school staff in ensuring children learn
- A clear and consistent focus on student learning
- Reflective dialogue on curriculum, instruction and student development
- Deprivatising practice to make teaching public
- Focus on collaboration.

A review of PLC literature identified collaboration, a focus on student learning, teacher authority, and continuous teacher learning as central in promoting change in teaching practice (Vescio et al. 2008). Structured, sustained and supported instructional discussions and investigation of the relationships between instructional practices and student work has been shown to lead to significant gains in student learning (Supovitz 2002; Supovitz and Christman 2003). In identifying best practice for teacher professional learning, Timperley et al. (2007) identified that a teacher inquiry and knowledge-building cycle is central to improving student outcomes and effective professional development. This cycle highlights both the link between student and teacher learning, and the iterative nature of high quality professional learning.

Similar cycles have been identified by researchers and practitioners in the field of professional learning communities (Birenbaum et al. 2009; DuFour et al. 2010; DuFour and Marzano 2009; Hord and Sommers 2008) and professional learning teams (Griffin et al. 2010; Sather 2009), and an assumption of continuous teacher learning underpins all these cycles. Teams facilitate student learning by determining student learning needs and devising teaching programs. This identification, followed by decision-making, constitute the core activities and responsibilities of the professional learning teams.

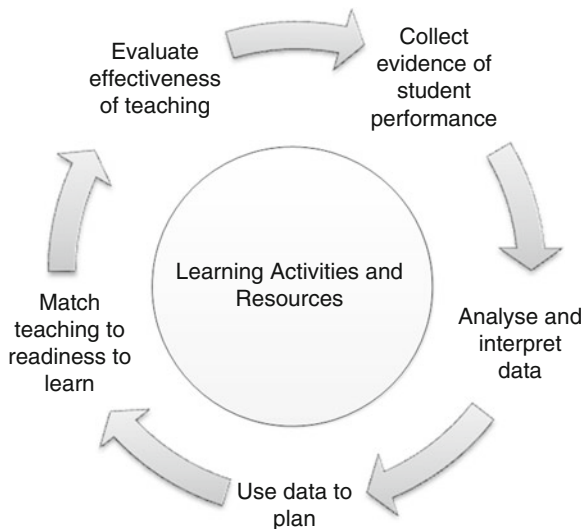
Although there is variation in the degree to which teacher learning is explicitly stated in the cycles, there is an expectation that the iterative nature of the cycle facilitates teacher learning and will ensure teaching programs become more effective over time. With the assumption that improvements can always be made, the cyclic review process is intrinsic to effective professional learning. The metacognitive capabilities of the team and its members are intrinsic to this process.

It appears that, for a PLC/T to be effective, it must focus on work that facilitates teacher learning and at the same time focus on work that facilitates student learning, and that this work be undertaken in a collaborative way which opens up teachers' practice to their peers. The cycle depicted in Fig. 47.1 provides a simplified view of the activities and procedures typically followed by PLTs.

47.4.2 Team Engagement

A generally accepted criterion for a team to exist is that the work undertaken requires task-based interdependence among group members (McIntyre and Salas 1995; Coovet et al. 1995). That is, team members interact by way of exchanging information, sharing resources, and coordinating with and reacting to one another in the course of accomplishing the group task, although the degree of interdependence varies greatly

Fig. 47.1 Action cycle for professional learning teams



(Cohen and Bailey 1997). This aspect of team work represents *how* team members work together. The term *team engagement* has been used to encompass the interaction of team members including behavioural, procedural and temporal components that describe a team's functioning (Coovet et al. 1995). It is only by analysing these interactions that the team's effect on performance can be measured (Coovet et al. 1995).

The literature shows much agreement on the aspects of team functioning that influence effectiveness as shown in Table 47.1.

Teams do not operate in isolation but are embedded in one or more larger contexts (e.g. school, network, and region) which affect team functioning (Joshi and Hyuntak 2009). The context affects both team decision-making and performance through aspects such as staffing, reward systems, access to resources and organisational climate (Guzzo 1995; Sundstrom 1990). It is important to consider how factors related to specific settings affect team functioning.

A range of constructs related to the behaviour of members has been identified. Team members providing feedback to each other and helping each other complete tasks (backup behaviour) has been shown to be an important aspect of team functioning (Guzzo 1995; Tannenbaum et al. 1992). Similarly, communication between members has been identified as an influential element, encompassing aspects such as conflict resolution and problem solving. Another aspect of team membership recognised by many researchers is a construct of cohesiveness. This has been differentially described as feelings of belonging, self-awareness of team membership or identification with the team.

The degree to which team engagement requires a common perception of the process and of the learning by the group is unclear. Perceptions of the group and its membership are naturally influenced by the individual's own place within the group and perceptions of self. The individual's metacognitive capacity may have real implications for the degree to which the individual is able to reflect upon the

Table 47.1 Team engagement factors identified in the literature

Constructs that influence effectiveness	
Context/environment/organisational support	Pasmore et al. (1982), Campion et al. (1993), Cannon-Bowers et al. (1995), Driskell et al. (1987), Gladstein (1984), Sundstrom (1990), and Tannenbaum et al. (1992)
Providing feedback	Hackman (1987), Sundstrom (1990), and Tannenbaum et al. (1992)
Providing back-up behaviour	Campion et al. (1993) and Gladstein (1984)
Effort brought to bear on tasks	Klimoski and Jones (1995) and Salas et al. (1992)
Building team capital/boundary management	Gladstein (1984), Sundstrom (1990), and Tannenbaum et al. (1992)
Communication/conflict resolution/ problem solving	Driskell et al. (1987), Gladstein (1984), and Tannenbaum et al. (1992)
Coordination/cooperation	Campion et al. (1993) and Klimoski and Jones (1995)
Self-awareness of team membership/supportiveness	Campion et al. (1993), Gladstein (1984), Klimoski and Jones (1995), and Tannenbaum et al. (1992)
Adequate skills	Driskell et al. (1987) and Gladstein (1984)

learning progress of the team as a whole, and consequently to contribute to its collaborative learning and development of shared identity.

A specific interest in this study is the decision-making functioning of teams because the prescribed function of PLTs is to make decisions regarding student and teacher learning needs. Decision-making encompasses interconnected activities including gathering, interpreting and exchanging information; creating and identifying alternate courses of action; choosing alternatives by integrating the often-differing perspectives and opinions of team members, and implementing a choice and monitoring its consequences (Guzzo 1995). The monitoring of team decisions brings a temporal dimension to the study of teams, whereby decisions are informed by the consequences of previous decisions and adjusted as required. This monitoring relies on the metacognitive and learning capacities of the team as a whole and on its individual members. The PLTs conform to an action cycle as depicted in Fig. 47.1.

It is clear that there are varied factors and combinations of factors that contribute to team effectiveness. The goals of teams both reflect and are structured by the populations with which they work and their environments.

47.5 Metacognition

The change from a deficit to a developmental approach to learning and teaching is a paradigm shift for many teachers. The evidence pertaining to teacher learning shows that teacher knowledge regarding content is more transformable than teacher

knowledge regarding the conception and character of teaching and learning (Borko and Putnam 1996; Bransford et al. 2000). From a cognitive perspective, the paradigm shift requires open reflection as it challenges teachers' previous beliefs and assumptions regarding the role of assessment and teaching. The metacognitive aspects of change involved in professional development for teachers has been described by Lin (2001), who points out that "people engage in metacognitive reflection when their identity in normal practices is called into question" (p. 435). Similarly, different authors have concluded that the role of metacognition is critical when the task that individuals are facing is complex and demanding (Holton and Clarke 2006; Manning and Payne 1996).

Considering the emphasis that learning environments have on developing metacognitive skills (Goos et al. 2002; Vye et al. 1998), it is particularly apt the development of metacognition comprise a component of professional development in the education context. Reflective focus on evidence of students' developmental learning and its link to suitable targeted teaching strategies, models the metacognitive skills of monitoring and regulating self-understanding and learning. Programs can be designed to provide social and environmental support for teachers' development of their metacognitive awareness.

It is logical that if teachers modify their beliefs about the role of assessment this can impact on the way they engage in deeper metacognitive processes to analyse and understand their own learning. Holland and Adams (2002) point out the relevance of professional development plans to sustain teachers' learning and practice. This is especially important when the plans are based on a reflective process that "involves teachers in recognizing their responsibilities as professionals to make good decisions about complex matters, and to understand and improve their practice through careful study of their own teaching and the context in which it occurs" (p. 234). An important aspect of this study is that the teacher focus on the impact of their teaching on student learning. This process is likely to be strengthened and deepened by improving teachers' metacognition, promoting the sustainability of the teacher professional development required to improve all students' learning and to maintain this improvement.

47.6 Student Learning

The measurement of student learning is a complex matter. Students naturally accumulate skills and knowledge through a process of maturation, and through engagement in classroom-based activities. In order to identify whether student learning under specific circumstances is greater than would generally occur, many systems use large scale testing programs. By their very nature, the tools used in large scale assessment tend to include relatively brief and easy to score tasks or items. Given that such tools can sample only some aspects of the relevant domains of learning, only limited interpretation of aggregate data on student learning is possible. Part of the reporting has centred on the "effect size" approach, that is, a quantification of how much improvement has occurred over various periods of time. As the effect size reported is

greater or less than ranges reported on the basis of meta-analyses (Hattie 2009), so groups of students are regarded as advantaged or disadvantaged by their schools or school systems. Such imputations are based on several assumptions, two being pre-eminent – that the progressive improvement of academic achievement of students is possible, and that actual educational achievement is most efficiently predicted and measured by these objectively scored standardised tests. There is a reason for this emphasis on standardised tests. Measurement specialists have been developing these tests for over 100 years, and have become very good at the craft. In the meantime the work has convinced politicians and system leaders that the tests are measuring what is important. An alternative view is that they are measuring what the decision-makers regard as important. There is much debate about whether more creative disciplines should also be assessed. Some moves are being made to develop assessments of skills such as collaborative problem solving and social networking (Griffin et al. 2012). Critics of the predominating use of tests measuring literacy and numeracy complain that these new disciplines are equally if not more important than reading and mathematics. They may be correct. But they have yet to convince decision-makers of their argument and they are yet to secure the resources that would enable large-scale assessment to take place. They are also yet to develop assessment measures that are cost-effective. When the critics have achieved these goals we may see a different approach to large-scale assessment.

Beyond the large scale policy use of standardised objectively scored test results, under certain conditions the test data can also be used by teachers to inform their teaching of individual and small groups of students. For example, where the tests themselves are designed to indicate student level of skills across core areas, such as literacy and numeracy, rather than indicating content mastery, reporting of results within the context of developmental learning progressions provide information to guide teacher selection of strategies and resources for appropriate interventions with students (Care et al. 2014).

47.7 The Study and Its Method

The key issue in this study concerns how teachers use student assessment data to inform their teaching. Factors which contribute to this process include teachers' understanding of the data, how the data relate to developmental learning progressions of the relevant skills, and teachers making decisions using the data within PLTs. Accordingly, constructs of interest at the teacher level include teachers' own learning and perceptions of this learning, and how teachers engage with each other through their learning teams to make decisions. At the student level, of interest is skill progression over a specified period of time. A large scale project was implemented over a period of 5 years, during which time different aspects of PLT activity were monitored as PLT members participated in a professional learning activity designed to enhance their understanding of how to use student assessment data, and how to evaluate outcomes of their interventions.

In a fore-runner to this study, the Literacy Assessment Project (LAP; Griffin et al. 2010), how teacher teams developed the capacity to use data to improve student learning was linked to the way in which teacher teams developed data-driven instructional systems to improve classroom practice and monitor student learning. Griffin (2007) and Alton-Lee (2008) showed how team leaders and teachers develop formative feedback systems. Timperley (2008) and Alton Lee (2008) also showed that teachers in teams need to develop as members of their teams. In LAP, cohorts of teachers learnt how to challenge each other and use evidence to discuss specific issues in a professional experience-based learning approach. Follow-up and support was provided at both system level and school level based on the presumption that a whole-of-school commitment is required in order to implement cultural change. The LAP project incorporated learning opportunities for teachers consistent with principles that underpinned the CLaSS project as a school improvement strategy (Hill and Crevola 2005). It was also consistent with the recommendations of Fullan et al. (2006) who highlighted the importance of professional learning. They identified three core elements that enhanced sustained change in schools: personalization, precision, and professional learning. They argued that assessment for learning, although frequently spoken about, was not broadly or effectively practiced in schools. In the Griffin et al. (2010) approach, the emphasis was placed on assessment for teaching.

The normal practice in teacher professional development programs and in pre service training is to focus first on teaching strategy. The teacher development component of the Assessment and Learning Partnerships made it explicit that the prior teacher condition must be measured and linked to a learning progression of the construct of interest. The professional development intervention itself is designed and linked to the teacher-focussed learning progression/s.

The online professional development course builds the capacity of teachers in the collaborative, evidence-based decision making to inform teaching. The course has two areas of focus, the development of effective collaboration within the PLT and the use of assessment data to inform teaching. In the area of PLT collaboration, teams develop the capacity to identify and target areas for PLT progress. These areas include communication, decision making, conflict resolution, the development of teacher skills and knowledge and the role of operating teacher value systems. In the area of data use, teams investigate the integral role of assessment for informing teaching and learning, including the development of a theoretical and practical understanding of the principles of assessment where the emphasis is on purpose, data collection, and the strengths and weaknesses of various assessment and teaching approaches. Teams are exposed to a range of assessment purposes, evidence gathering procedures, interpretation frameworks, decision making strategies, as well as recording and reporting formats.

The online program involves teams of teachers working together in a PLT. Each team is coordinated by a team leader. Each online module consists of objectives, content, readings, apply to practice exercises and progress checks. PLT self-monitoring is assisted by a series of research instruments provided at key stages throughout the program. These instruments are completed by individual PLT members and provide

feedback against a range of teacher and team developmental progressions. Each team undertaking the program is supported by an online facilitator who provides reflective feedback both online and during school visits to PLTs during the year. The model used to support the learning of the PLTs is the same as the model recommended for use by teachers to promote improved student learning.

The Assessment and Learning Partnerships provided the opportunity to integrate Fullan et al.'s (2006) emphasis on professional learning with Johnson's (2000) recommendations on the effectiveness of teams working at different levels. Level 1 teams functioned primarily within school, and consisted of teachers operating in the classroom, while Level 2 teams consisted of the team leaders across schools. At another level, but external to the professional development activities, the Level 3 group consisted of research and system level project management personnel. Within each level team members were accountable to each other rather than to an external system or top-down accountability structures. Some Level 1 teams worked across schools where the size of the schools was so small that there were insufficient numbers of teachers to form a Professional Learning Team. This was particularly the case for one and two teacher rural schools.

In terms of PLT culture and practice, as implemented through weekly or fortnightly meetings within school, teachers were accountable to PLT peers for the way they used evidence of student development, for decisions about interventions and resource use, and how these link to student learning outcomes. Teachers link the developmental level of individual students to an intervention strategy only after defending each selected strategy and resource with their colleagues. PLT group decisions drive all teaching interventions. The PLTs also explore the theory, research, and information about practices in their own and in other schools and maintain logs of these discussions to account for PLT strategies and their link to evidence of growth.

As a result of the professional learning and activities, student level data was expected to show growth, controlling for the effects of maturation and normal benchmarked progress for each year level. In any pre-test, post-test design, students who are lower initial achievers will appear to grow or improve more than those students at higher initial achievement levels. This regression-to-the-mean is expected to occur regardless of intervention (Campbell and Russo 1999). There is a need to examine therefore whether gains are to be attributed to maturation, regression, or practice effect due to the retesting procedures and criterion contamination. The expectation of the researchers was that the higher initial achieving group ought to improve faster, while maintaining the growth of the lower initial achievement group. This pattern should become more pronounced at each successive grade level, as student encounter more difficult conceptual material.

A series of student reports using specifically developed reporting software (Griffin 2003) is provided to teachers as part of the partnerships. These form the data that PLTs use to discuss differentiated intervention and targeting of teaching strategies.

In order to investigate the factors which contribute to the effectiveness of PLTs in the education setting as they follow the action cycle, a model (Fig. 47.2) was developed specifically for the educational environment and tasks of teams in an educational setting. Superordinate to the elements of the model is the activity of decision-making.

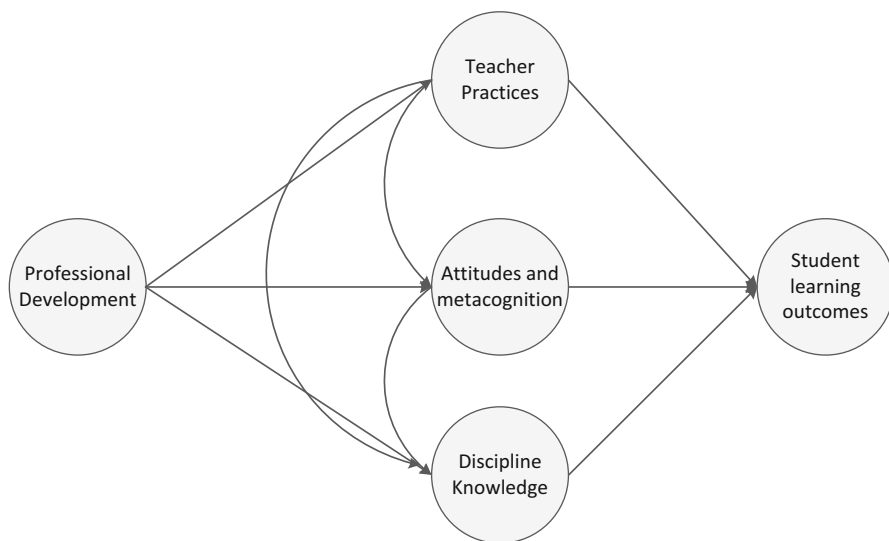


Fig. 47.2 Effects of PLTs on student achievement

Intrinsic in the model is the notion of developmental learning applied to teachers as well as to students. An important feature is the degree to which members of a PLT are aware of their own learning or developmental pathways. To capture that awareness, teachers can self-consciously evaluate their and their team's progress, which in turn informs continued action. The metacognition of the teachers, if measured along a developmental progression within this specific context, may in fact guide their learning.

The model represents a range of research propositions, the primary of which is that student achievement is a function of teacher practices; introspective characteristics including beliefs, values and metacognition; and their discipline area knowledge. In turn, these factors are influenced by the teachers' participation in and commitment professional development activities. Within the domain of teacher practices lie the elements of PLT practices and engagement, and pedagogical practices. Within the introspective domain lie beliefs about teaching and learning, values concerning students, and metacognitive abilities. Within the domain of knowledge lies teacher expertise in the discipline area. Measures of the components identified in Fig. 47.2 were collected in several ways. All student data were collected through their online completion of tests of literacy, numeracy and problem solving at different times of the academic year. Measures of each of the teacher domains were developed in order to test the propositions and collected primarily through online surveys but also through professional development workshop activities and focus groups.

In this chapter, results for student literacy, and more specifically reading comprehension, are presented to illustrate the influence of the intervention on student learning outcomes. Teacher data were collected online through questionnaires, through online tasks embedded in the professional learning modules, and through

observation of PLTs and focus group sessions within schools. Focus group discussions of the issues associated with the implementation of the process, as well as measures of teacher beliefs, accountability, use and pedagogical content knowledge were monitored over time to determine the teacher professional development and its relationship to changes in student learning. Teachers working in teams interpreted standardised student test data within a developmental model in order to make decisions concerning intervention according to the cycle in Fig. 47.1.

The student data were analysed within year levels to illustrate learning gains over an 8 month period. The teacher data were collected continuously throughout the year, consistent with different aspects of team functioning and interpretation of student achievement data modules being completed as part of the online learning program.

47.8 The Teacher Constructs and Their Measures

47.8.1 PLT Activity and PLT Engagement

PLT activities are considered to be divided into those activities that facilitate student learning and those that facilitate teacher learning and are integrated as part of a continuous cycle. Activities facilitating student learning include using assessment data to identify student learning needs (Birenbaum et al. 2009; DuFour and Marzano 2009; Hord and Sommers 2008; Timperley et al. 2007) and devising evidence-based teaching plans (Sather 2009; Timperley et al. 2007). Activities facilitating teacher learning include using student assessment data and other forms of evidence to review the effectiveness of teaching actions and determine teacher learning needs (DuFour et al. 2010; DuFour and Marzano 2009; Hord and Sommers 2008; Sather 2009; Timperley 2011) and aiding the development of associated teacher skills (Hord 1997; Hord and Sommers 2008; McLaughlin and Talbert 2006; Timperley 2011; Timperley et al. 2007). PLT activities are considered to be more sophisticated when they draw on a detailed understanding of data interpretation Griffin et al. (2010) and target learning to the zone of proximal development (Vygotsky 1986) of the students and teachers.

PLT Engagement is considered to be an individual's willingness to participate in the activities of the team. It draws on the components of effective teamwork drawn from organisational psychology (Tannenbaum et al. 1992) and includes providing feedback and back up behaviour to other team members, communicating openly with the team, bringing efforts to bear on PLT activities, working to build team capital and self-awareness of team membership (the extent to which individuals value their participation in the team and believe that greater student learning will be achieved when they work as a team rather than as individuals). These components encompass the teamwork described in the PLC literature (Hord 1997; Newmann and Wehlage 1996). Its levels of sophistication mirror those described in the Taxonomy of Educational Objectives: Affective Domain (Krathwohl et al. 1964) and move from those willing to receive information within a PLT context, to those who characterise the values of PLT in all that they do and use these values to influence educational policy (Manning and Payne 1993).

Table 47.2 Developmental progression in team activities

Level	Description
A	Viewing existing student achievement information PLTs at this level look at information which describes the achievement of their students
B	Sharing practices PLTs at this level discuss and consider teaching and assessment practices based on familiarity, ease of use and curriculum expectations
C	Exploring student evidence to inform teaching PLTs at this level combine evidence of student learning to determine areas of need and make associated teaching plans. They discuss the suitability of assessment data to inform teaching. They seek evidence to resolve disagreement
D	Changing professional practices PLTs at this level combine evidence of student skills to identify what students are ready to learn and develop teaching plans collaboratively. They review data to determine teaching effectiveness. They discuss plans for improving our teaching and assessment practices and assist each other to implement new and relevant practices
E	Taking shared responsibility for student and teacher learning PLTs at this level make evidence-based teaching plans. They take responsibility for improving the professional practices of members so they can enhance the learning of all students. They discuss difficult issues in a frank and professional way
F	Synthesising evidence-based practices PLTs at this level review all practices in terms of their explicit consequences for student learning. They take responsibility for developing the professional practices of all members by addressing the skills each member is ready to learn in an evidence-based manner
G	Conducting research to inform practice PLTs at this level conduct action research into the effectiveness of teaching and assessment practices order to contribute to the knowledge of teaching and learning both within our PLT and in the wider educational community

Self-report instruments for teachers were developed to measure PLT activity and PLT engagement. The instruments were calibrated using the responses from Victorian primary and secondary teachers (374 to PLT Activity and 508 for PLT Engagement) and used to identify progressive levels of increasing sophistication of the PLT operation as reported by individual members.

The items in both instruments have a consistent form and require teachers to examine an indicative behaviour and to select a statement from between 2 and 4 descriptions of differing sophistication that best describes the way they carry out this behaviour. The PLT Activity instrument has 18 items and the PLT Engagement instrument 30.

The level descriptions derived from each instrument form two developmental progressions that describe the activity and engagement constructs underlying each instrument. The progressions were panelled to ensure they were clear and indicative of observable behaviours of professional learning teams and their members. The final progressions are shown in Tables 47.2 and 47.3. In each progression level A denotes less sophisticated functioning and as the levels increase, so does the level of sophistication. The progressions indicate that the functioning of less sophisticated teams incorporates fewer of the practices identified by the literature as providing high-quality

Table 47.3 Developmental progression in team engagement

Level	Description
A	Receiving Teachers at this level meet together to learn about PLT activities
B	Responding Teachers at this level comply with PLT activities in meetings. They participate in discussions and listen to the views offered
C	Accepting the value of the PLT Teachers at this level engage in PLT activities because they believe they help improve the learning for some students. They report back on the implementation of teaching plans and complete PLT-related activities outside the meetings when other priorities allow
D	Committing to the value of the PLT Teachers at this level are committed to participating in PLT activities. They complete them to the best of their ability and support others to do so if they seek help. They take opportunities to inform others of the benefits of their work and make plans to ensure their teams are successful
E	Aligning actions to PLT expectations Teachers at this level organise their individual actions so the actions are consistent with PLT expectations. They take joint responsibility for the success of their PLT activities by participating in discussions and reporting back on their work outside meetings. They seek feedback from other members and provide feedback and encouragement to each other. They make efforts to build the success of the PLT in order to enhance the learning of their students
F	Prioritising the PLT Teachers at this level prioritise PLT activities over other school demands as the activities enhance the learning of all students. They communicate openly about the effectiveness of their teaching, use their time productively and are proactive in their support of each other to ensure they are successful at improving student learning. They take actions to ensure the sustainability of their PLT both within the team and with school leadership
G	Characterising PLT practices Teachers at this level act in accordance with PLT practices in all aspects of their work. They coordinate their actions to ensure they improve student learning and seek opportunities to advocate their approach to others
H	Exerting influence Teachers at this level use their links with people or organisations outside their PLT to influence policy and strategic planning in ways which characterise their PLT practices

teacher and student learning, while more sophisticated teams incorporate many of these practices. It also indicates that, generally, practices relating directly to student learning are established before practices relating to teacher learning.

The Developmental Progression of PLT Engagement shows that, for professional learning teams, the elements of team processes identified in the literature (feedback, back-up behaviour, effort, team capital, communication and self-awareness of team membership) do not develop independently of each other but instead develop in a predictable order. Communication is the starting point. From there team members begin to put some effort into the team activities and then feedback and back-up behaviours begin to develop. Once basic communication, feedback and back-up

behaviour processes are in place then members start to identify with the team (self-awareness of team membership) and begin to engage in building team capital.

The order of development of engagement in team processes matches the typical order of development within the affective domain, as described by the Taxonomy of Educational Objectives (Krathwohl et al. 1964). The consistency between the stages of affective development and the development of engagement show there is a relationship between the sophistication of teachers' engagement in the team processes and their attitudes towards the team.

47.8.2 *Metacognition*

The Assessment and Learning Partnerships challenges teachers' understanding of teaching and learning within a developmental paradigm. It is assumed that teachers' metacognition plays a critical role for both teaching practice and the sustainability of teacher learning. Teacher metacognition is understood to be the conscious and deliberated thinking process about their teaching and learning (Darling Hammond and Bransford 2005; Duffy et al. 2009; Lin et al. 2005; Manning and Payne 1996; Zohar 2006). This thinking process enables the mental awareness that teaching requires, and the examination of one's level of comprehension about the complexities of differentiated teaching and the challenges that this creates for professional learning. Moreover, this thinking process enables teachers to link the complexities of differentiated teaching with the evaluation and regulation of their own professional learning. The definition, description and measurement of metacognition has a reasonably recent history (eg. Alexander 2008; Dinsmore et al. 2008; Duffy et al. 2009). For the purposes of the Assessment and Learning Partnerships, a questionnaire for teacher completion was developed reflecting a five stage framework of teachers' metacognition. The questionnaire draws upon Schraw and Dennison's (1994) Metacognitive Awareness Inventory.

The framework considers different components of metacognition and is designed to connect teacher's understanding about the complexities of differentiated teaching practice with the evaluation and control of their own professional learning. In brief, the first stage refers to teacher's comprehension of the complexities of differentiated teaching practice, and awareness of the thinking strategies required to deal simultaneously with different tasks. In the second phase, teachers evaluate their current competence to face different teaching challenges. Third, teachers plan their own professional learning, evaluating the resources and defining the best strategies to achieve the goals defined. Fourth, teachers monitor and control their own process, employing different strategies for learning, reflecting on the extent to which these strategies are being effective, and changing them as needed. Finally, and fifth, teachers evaluate both the extent to which the goals set have been achieved and their own capacity to put them into practice in the specific teaching context. This outcome allows a deeper comprehension of the complexities of differentiated teaching practice, and the cycle starts again at a more complex level.

The initial development of the instrument was based on the responses of 169 teachers from Victorian primary and secondary schools, and its technical properties

Table 47.4 Developmental progression in teacher metacognition

Level	Description
A	Perceiving the need of differentiated teaching Teachers at this level recognise the need to monitor students at different skill-levels. They are aware of the importance of collaborating with other teachers for their professional learning
B	Reflecting on teaching strategies and professional learning needs for differentiated teaching Teachers at this level perceive the importance of targeting teaching to the skill-levels of students and analyse their teaching strategies in relation to those levels. They are able to adapt teaching strategies in response to classroom events. They can link differentiated teaching with their own professional learning needs while being aware of the complexities of teaching higher ability students. They analyse the effectiveness of their own learning strategies, adapting them if necessary, and are aware of the impact on learning of factors such as motivation, engagement and uncertainty
C	Analysing differentiated teaching strategies and linking it with own professional learning Teachers at this level analyse the impact of teaching strategies on students at different skill-levels. They reflect on how their comprehension of students working at different skill-levels makes them question their own, and other teachers', assumptions about teaching. They also think about how the comprehension of student learning processes is related to their own professional learning. They can plan their professional learning, monitor their level of understanding and link it with their teaching practice
D	Evaluating the effectiveness of differentiated teaching and professional learning progress Teachers at this level link the learning progress of students at different skill-levels with their capacity to target teaching to those levels. They monitor their own learning progress with regard to set goals and review their own understanding in the light of feedback from other teachers. They also evaluate their learning in the light of its impact on the progress of student learning
E	Challenging and reorganising own and others' assumptions about differentiated teaching Teachers at this level assimilate other teachers' understanding of students at different skill-levels when reshaping their own assumptions about differentiated teaching. They understand how student learning progresses well enough for them to challenge other teachers' understanding about students at different skill levels. They are able to relate this understanding to the need for differentiated teaching
F	Influencing other teachers' thinking about differentiated teaching and its impact on professional learning Teachers at this level think in ways that influence the thinking of other teachers on the importance of differentiated teaching. They link their own learning progress not only with the progress of student learning but also with their capacity to influence other teachers' views and practices regarding the challenges that differentiated teaching involves for professional learning

are reported in Arratia-Martinez et al. (2013). The final survey comprises 43 items, in the form of statements with which teachers indicate their degree of agreement across four response options. The instrument was developed using the Rasch model (Wright and Masters 1982), and teacher metacognition is reported across a developmental progression shown in Table 47.4.

47.9 Student Achievement

For the reading comprehension assessments, items were developed that would capture a range of performance across grade levels attended by students from approximately 8–14 years of age. Following item development, a skills audit was conducted on all test items in order to ensure that the items were consistent with the previously developed learning progression. A skills audit is a process that identifies the cognitive skill required to answer each question correctly. Test data were calibrated using item response theory software Conquest (Wu and Adams 2007). This process determined the information that defined the literacy construct in order to report progress and identify starting points for learning. At both the beginning and end of the 8 month period, teachers administered pre- and post-tests. Common item equating procedures were used to map items from the selected tests onto a single continuum. The skills audit was used to interpret the variable and to define a common developmental progression of learning. Students were then placed at the level indicated by their ability estimate. Student performances on the underlying construct were disseminated to schools using the reporting software ALPS (Griffin 2003).

Hattie (2009) recommends a benchmark of 0.4 effect size within a 1 year program for assessing good progress for a typical student. Hence student progress can be benchmarked against this rate of development at a large scale level. Notwithstanding, the focus in this project is on use of the data at individual student level for the purpose of informing the teaching and learning process.

47.10 Participants

47.10.1 Teachers

The 251 teachers in the sample for whom results are reported here, were drawn from 1,358 teachers who self-selected to participate in the Assessment and Learning Partnerships research activities. The teachers were included based on their having taught the students matched across two assessment occasions, described below, and on their participating in that aspect of the research program in which measures of PLT Engagement and Activities and Metacognition were completed. The Principals first provided permission for school participation as the necessary condition for teachers to engage in the research activities, and for student achievement data to be analysed. Each school allocated time for their PLTs to meet and examine the data and its connection to their intervention practices. The sample includes teachers from 23 to 66 years of age and includes both females (78 %) and males (22 %). The professional experience of these teachers ranges from those in their first year of teaching through to teachers with up to 37 years' experience. Of the total, 194 of the teachers had primary teaching experience (mean = 12.5 years) and 67 had secondary teaching experience (mean = 10.1 years).

47.10.2 Students

The 2,926 students whose performance on tests of reading comprehension are reported here, are part of a larger group of 4,998 students studying in government co-educational primary schools in the state of Victoria, Australia. The schools which they attended were participants in the Assessment and Learning Partnerships. The sample of 2,926 constitute those students with matched data across two assessment occasions some 7–8 months apart, and who studied in classrooms within which their teachers were also participating in that aspect of the research in which they completed measures of the constructs of interest within this study – PLT Engagement and Activity, and Metacognition. The suite of projects within the partnerships include, under a variety of logistical models, Principals providing resourcing for participation, teachers participating in professional development activities, Professional Learning Teams, and students engaging in their normal classroom activities and completing online tests. The students are aged from 8 to 12 years.

47.11 Results

47.11.1 PLT Activity and PLT Engagement

Distributions across the developmental progressions for PLT Activity and PLT Engagement are shown in Figs. 47.3 and 47.4. The distribution for PLT Activity indicates clearly that a majority of this teacher group are still coming to terms with changing practices in teaching promoted by the professional learning activities, and taking shared responsibility with each other for student progress. Fewer teachers are synthesising and questioning data to inform practice.

The distribution for PLT Engagement indicates that a majority of the teachers are moving towards sophisticated levels of engagement. There is endorsement of the priority of the PLT within the teaching and learning process, and the teachers appear to be identifying strongly with their team.

The difference in the distributions across the two aspects of PLT functioning indicates that these two aspects are clearly independent of each other. One aspect is sampling the actual activities of teachers while the other is accessing more attitudinal components. The degree to which valuing of the Assessment and Learning Partnerships approach might have some delayed effect on actual activity change remains to be ascertained.

It is not clear from this study whether the level of engagement of the respondent affects their perception of the actions of their team and their school leadership or if the actions of the team and the school leadership impact on the engagement of the individual. It is possible that both occur simultaneously. This relationship was not able to be explored with the data set used for this study, as there were insufficient teams where all members had completed the questionnaire.

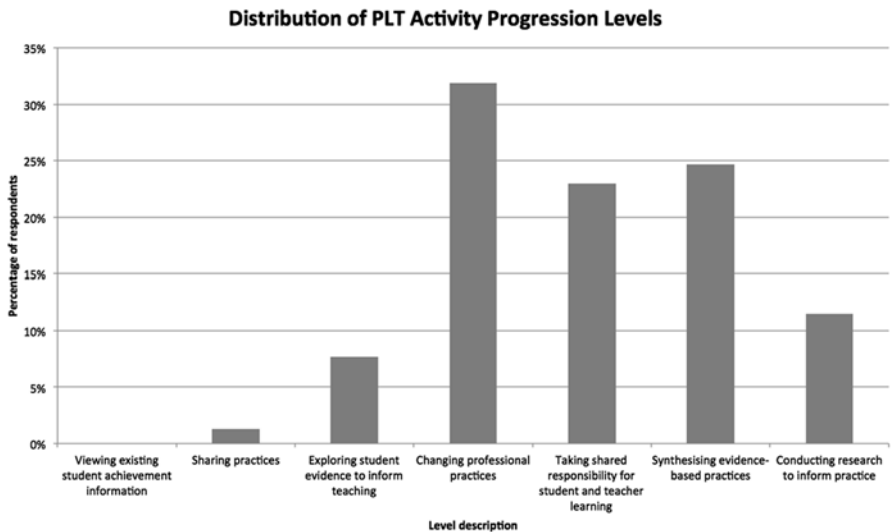


Fig. 47.3 Distribution of N=235 teachers' level of activity within the professional learning team

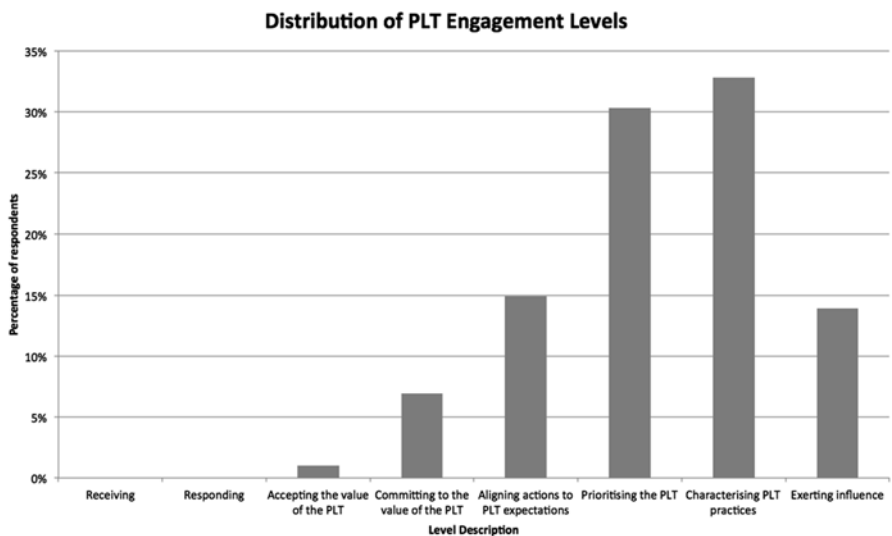


Fig. 47.4 Distribution of N=201 teachers' level of engagement within the professional learning team

47.11.2 Metacognition

The distribution of teacher metacognition is shown in Fig. 47.5. This relatively small sample has an almost rectangular spread across all levels, from those teachers who are coming to terms with the notion of providing different interventions for

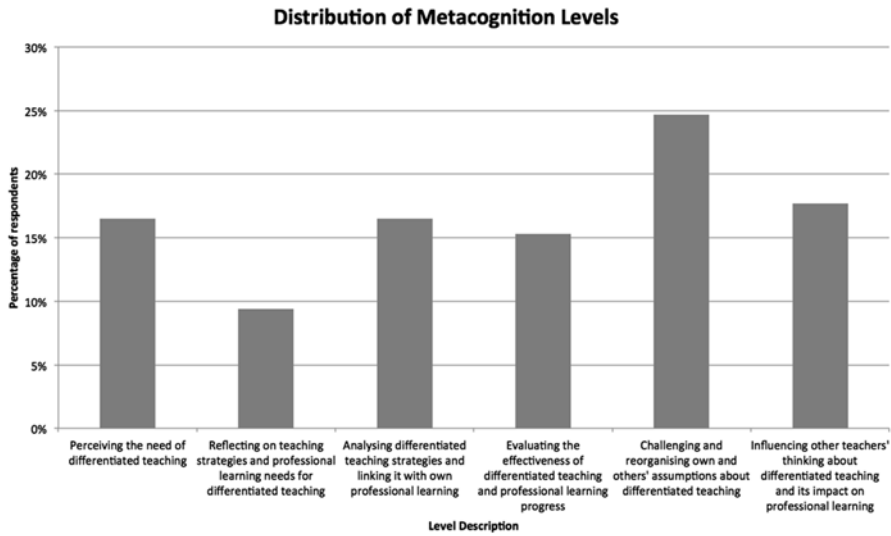


Fig. 47.5 Distribution of N = 85 teachers' level of metacognition

students at different achievement levels, through to self-awareness of the need to evaluate their practices and learning, and on to self-conscious awareness of the application of the teaching and learning paradigm to their own experience and the experience of the PLT.

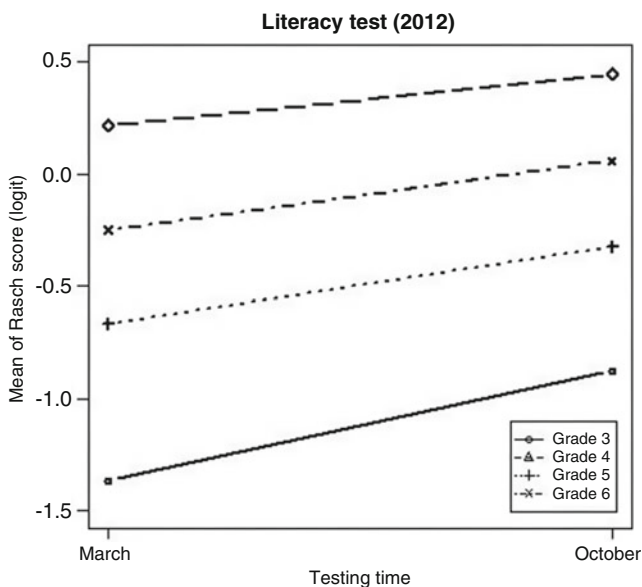
47.11.3 Student Data

A sub-sample of primary schools students who completed tests of reading comprehension both in 2012 March and 2012 October and whose teachers also participated in the Assessment and Learning Partnerships project in 2012 were selected for analysis. The students whose achievement scores are equal to or less than the 25th percentile of the scores in March are depicted as lower achieving students and those with achievement scores equal to or greater than 75th percentile are depicted as higher achieving students. The numbers of students across the grade levels whose results are used for this analysis are shown in Table 47.5.

The descriptive statistics of the students' achievement scores for Grades 3–6 are summarised in Table 47.6. The means of the achievement scores by grade show that the higher the grade level of the students, the higher the mean scores both for March and October. There are statistically significant differences between the mean scores on March and October for all the grades. Figure 47.6 displays the improvement in mean scores from March to October underlying Table 47.6. The changes from March to October lead to an effect size for the half year greater than (for Grade 3, 4, and 5) or close to (for Grade 6) the benchmark of 0.4 effect size for a 1 year change

Table 47.5 Student sample size

Grade	Total	Lower achieving group	Higher achieving group
Grade 3	725	193	182
Grade 4	640	162	160
Grade 5	814	204	204
Grade 6	747	187	187

**Fig. 47.6** Growth of students' scores on literacy from March to October across grades

recommended by Hattie (2009). The results therefore suggest a substantive positive overall growth of the students from March to October double and beyond that typically associated with interventions.

The comparisons of score changes from March to October between lower and higher achieving students by grade suggest that the growth of the lower achieving students is the main contributor to the overall growth results. Table 47.7 presents the descriptive statistics of achievement scores as well as the means of the score changes from March to October for both lower and higher achieving students. The results of non-parametric statistical analyses indicate that there are statistically significant differences on the achievement scores from March to October for the lower achieving group for all grades. The mean differences of the lower achieving students' scores between March and October, which range from 0.45 to 0.85 logits, are greater than the corresponding overall changes (Table 47.6) for all grades. In addition, the effect sizes for all grades, which are almost double or even triple the 1-year change benchmark of 0.4 (Hattie 2009). This suggests substantive growth over half a year for

Table 47.6 Descriptive statistics of students' reading comprehension achievement scores by grade

Grade	N	2010 March				2010 October				Mean difference		Effect size (Cohen's d)
		Min	Max	Mean	Std	Min	Max	Mean	Std	Mean	SD	
		3	725	-3.690	1.310	-1.368	0.947	-2.987	1.641	-0.876	0.892	
4	640	-3.690	2.034	-0.666	1.062	-2.987	2.496	-0.326	1.004	0.340	0.638	0.533
5	814	-3.072	2.268	-0.250	1.100	-2.987	3.189	0.060	1.079	0.310	0.638	0.486
6	747	-2.188	2.433	0.217	0.967	-2.121	3.370	0.445	1.008	0.228	0.636	0.358

Table 47.7 Descriptive statistics of lower and higher achieving students' reading comprehension achievement scores by grade

Grade	Ability group	N	2010 March		2010 October		Difference between March and October		Effect size (Cohen's d)
			Mean	Std	Mean	Std	Mean	SD	
3	Lower	193	-2.482	0.382	-1.628	0.612	0.854	0.629	1.358
	Higher	182	-0.105	0.503	0.085	0.682	0.189	0.626	0.302
4	Lower	162	-2.036	0.505	-1.396	0.587	0.641	0.624	1.027
	Higher	160	0.675	0.468	0.725	0.729	0.051	0.655	0.078 (ns)
5	Lower	204	-1.714	0.487	-1.125	0.734	0.589	0.637	0.925
	Higher	204	1.119	0.389	1.177	0.674	0.058	0.624	0.093 (ns)
6	Lower	187	-1.086	0.425	-0.639	0.651	0.447	0.600	0.745
	Higher	187	1.400	0.357	1.435	0.736	0.034	0.677	0.050 (ns)

lower achieving students. However, for the higher achieving students similar results were not obtained. There are no statistically significant differences in the change of the means from March to October for the higher achieving students in Grades 4, 5 and 6. Although statistically significant differences were found on the scores between March and October for the higher achieving students in Grade 3, the value of the mean difference as well as the small effect size are smaller than those of lower achieving students. Therefore, it is apparent that lower achieving students show greater growth than higher achieving students, as displayed in Fig. 47.7.

There are some limitations in the reporting of the analysis of student results that should be noted. First, in order to build links between teacher and student data, a convenience sampling strategy has been employed. Therefore, the distribution of the scores of the current sample of students (rather than normative cut scores) was used in the study to define the lower and higher achieving students. This may have implications for the generalisability of the findings. Second, the accuracy of the score estimates for the lower and higher achieving students might influence the findings. Fixed-form tests rather than computerised adaptive tests were used to estimate the students' reading comprehensions skills. If a non-targeted test (too hard or too easy) or insufficient targeted items in a test (few hard items or easy items) are used to measure the students' abilities, the students' abilities might not be accurately estimated. For example, a fixed-form test which provides a limited number of difficult items for measuring higher achieving students may increase the risk of score regression toward the mean. Fortunately, the testing system which was used to measure the students' literacy in the study can be seen as a quasi-adaptive testing system, where depending on how the students respond on the items, additional items better targeted to their level of skill are presented as part of the test. One of the main research purposes of the Assessment and Learning Partnerships is to provide teachers with the technical competence to target tests and to use assessment results to improve their teaching practice and effectiveness. Hence, teachers selected tests for students based on their estimation of their students' abilities. And in addition, the quasi-adaptive nature of the testing system enabled students who were mis-targeted, to take additional easier or more difficult test items based on their responses.

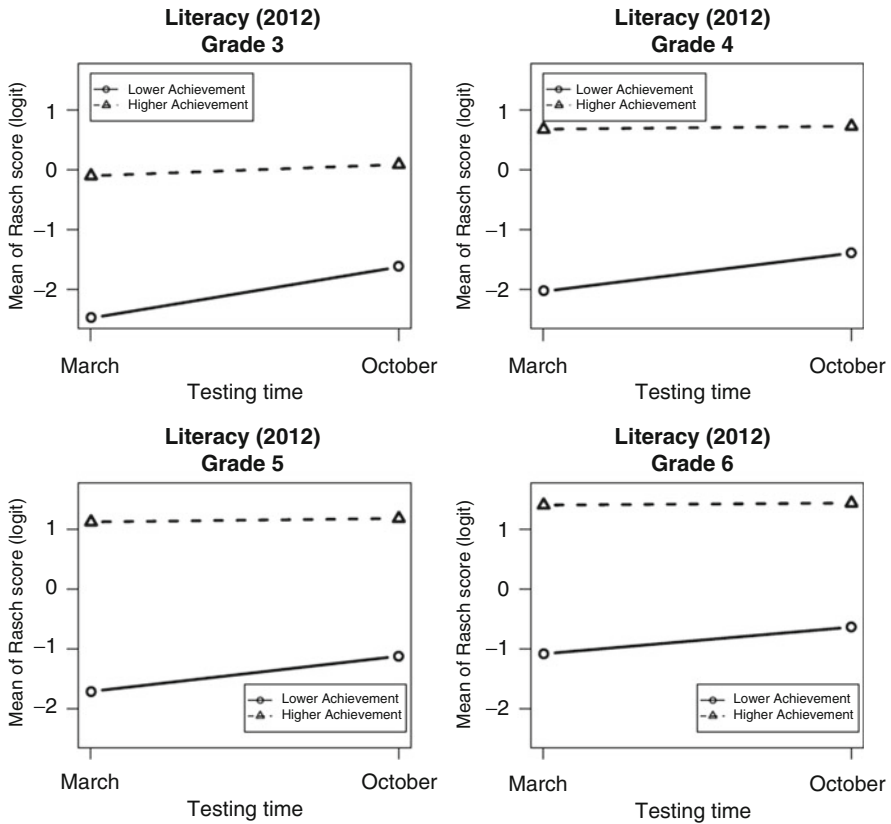


Fig. 47.7 Growth of lower and higher achieving students on literacy from March to October by grade

47.11.4 Teachers and Students

In this chapter it is argued that teachers who are fully engaged in the Assessment and Learning Partnerships’ approach to teaching will optimise the learning outcomes of all students. The approach entails differentiated instruction, use of assessment data to inform that instruction, and collaboration within teams for decision-making about interpretation of data and use of strategies and resources. The growth of the lower and upper quartiles of students in reading comprehension over a 7–8 month period is reported, as well as the distribution of the students’ teachers across levels of collaborative activity, commitment to their teams, and metacognitive capacity. The co-incidence of the uneven growth patterns of the two groups of students with the distributions of the teacher levels of sophistication across the full range of team work and metacognition declares the possibility that some teachers are not fully acculturated or skilled with the approach, with consequences for their intervening appropriately for all students. Where teachers are fully engaged in Professional

Learning Team activities, where they are operating at sophisticated levels in terms of their understanding of assessment data and how to use these to intervene with students, it is expected that all students will benefit from the teaching process. That this has not occurred raises the probability that the understanding and capacities of some of the teachers has not reached a level at which they are yet able to respond to the learning readiness of all students.

47.12 Discussion

In the Assessment and Learning Partnerships, the teacher development activities evolved over a number of years to incorporate research on evidence-based instructional intervention, professional learning teams, peer accountability, teacher discourse and differentiated instruction. In this chapter we have reported on the performance of students in the classrooms of teachers who are participating in professional development activities and who are planning teaching interventions within teams. The expectation of the partnerships is that if teachers are attending to the readiness of each student to learn at their individual levels, and if together with their teams they have identified the most appropriate strategies and resources to do so, then all students will make progress. In fact it is clear that a relatively significant group of students are not progressing at the same rate as their peers, and this group constitutes the upper 25 % of the grade level distribution. This phenomenon has been found across all year levels. The lower 25 % of students in each grade level is making relatively better progress than their initially higher achieving peers. One reason for this occurring could be that, despite teachers' focus on differentiated instruction, they have not recognised the needs of the higher achieving students. That this could occur is not surprising in the context of Australia's concern about "closing the gap" between groups of students, with particular focus on those students identified by social or ethnic disadvantage. This political imperative has been translated at school level into a particular concern for those students who characteristically find school work difficult. That this group of teachers themselves are shown to be spread across developmental progressions of skills relevant to their teaching may also contribute to the outcome. Where we do find teachers who do not yet fully understand and engage in the culture endorsed by the Assessment and Learning Partnerships approach, it may be that they are not yet able to implement the consequent differentiated practices with their students.

A possible explanation for the outcome might also lie in the timing and extent of focus on team engagement in the formal professional learning course. In an earlier implementation of the approach described in this chapter, the Literacy Assessment Project (Griffin et al. 2010), the first year of professional development was devoted to how the team would work together, how the team would deal with anomalies in the interpretations of data by its members, and hence how they would challenge each other in constructive ways. In the implementation from which the results are reported here, this component of the professional development is intermingled with

learning about the technical aspects of the data, and actually dealing with the student data. Consequently there is less “start-up” time for teachers to learn how to navigate the context in which they are making decisions. Mathieu and Rapp (2009) draw attention to the interaction of how teams work together and what they actually work on – teamwork versus taskwork. They report on the need to establish working relationships prior to embarking on the actual tasks, notwithstanding that such an approach is not typically normal practice.

In the Assessment and Learning Partnerships, entry to the program is dependent on schools’ preparedness to put in place specified infrastructure. This latter includes allocation of time for meetings, and time for staff to commit to the formal professional learning activities. Although these requirements might seem minimalist, they represent a significant commitment by the school leadership in terms of two very valuable commodities – time and money. This initial commitment in some cases is complemented by school leadership teams planning their staffing for the year of first implementation in order to enhance professional learning team composition. Above and beyond these commitments however, lies what might be referred to as readiness, and this concept applies to the collaborative teams as much as to the school leadership. The readiness of teachers to commit to the program in terms of engagement as opposed to physical presence is not easily achieved. Mathieu and Rapp (2009) argue that team effectiveness is driven by both teamwork and taskwork, and that developing high-quality plans for both aspects of team functioning is important, particularly in the early days of the team’s life. As seen by the differing distributions of teachers across PLT Activity and PLT Engagement in this study, it appears that teachers are more advanced in their views of how the team can work together than in actually implementing the consequences of the changes in attitude toward belief in all students’ capacity to learn. This may imply an imbalance in the sequencing of the professional learning activities provided by the project, or may be a natural phenomenon in terms of action typically following changed belief, rather than the reverse.

The question raised by the results reported here concerns the differential progress of groups of students in the growth of reading comprehension skills. These skills are reasonably generic, and can be assumed to inform student achievement across a wide range of curricular areas, especially as they move into and through secondary school. The comprehension skills constitute a literacy that is essential not only for its role in enabling learning, but for navigating society and the world of work. The skills are taught in their own right, particularly in the primary school years, and are relied on and enhanced through other studies. That a group of students in each year level are progressing strongly in the skills denies the possibility that the phenomenon is associated with a ceiling, either in the assessment materials or in the skill itself. Similar outcomes have been reported for numeracy by Care, et al. (2014), indicating that a generic issue is at stake rather than one that is discipline specific. In order to determine whether the same pattern occurs in the secondary school, similar analyses need to be undertaken with older students.

There is no doubt that the Assessment and Learning Partnerships approach is delivering excellent learning outcomes for the student cohorts overall, as indicated by the effect sizes reported here which are typically more than double those expected

on the basis of the literature (Hattie 2009). It is essential however, that all students receive the benefits of the teaching approach. In order to investigate this, in further research, direct links between groups of teachers located at different points on the relevant skills progressions need to be made with student learning outcomes, rather than relying on co-incident distributions.

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Chapter 48

Large-Scale Assessment of Vocational Education and Training

Frank Achtenhagen and Esther Winther

Abstract Our study is part of a European endeavor to measure effects of workplace learning by an international large-scale assessment in the fields of business and administration until 2020. We demonstrate how job-typical workplace tasks can be identified on a European level and, then, assessed at a web-based virtual workplace, which provides a broad spectrum of authentic tasks that typically have to be worked out at real workplaces and form the basis of assessment. By a field study – as a first step – we proved our assumptions, won data on the fulfillment of typical actions of clerks and used item response theory for evaluating a corresponding competence model as basis for a large-scale assessment of the effects of workplace learning.

Keywords Vocational education and training • Business and commerce education • Large-scale assessment • Item response theory • Technology-based assessment (TBA)

48.1 Introduction

This chapter discusses central topics of an international comparison in the fields of vocational education and training (VET) on a global basis. In terms of actual problems for workplaces such as shortage of skilled workers and employees or, more important, youth unemployment and, consequently, for VET – mainly caused by so-called “megatrends”, which require new twenty-first century skills (Buttler 1992, 2009; Achtenhagen et al. 1995; Achtenhagen and Grubb 2001; Griffin et al. 2012) – research and development activities have focused on which skills are

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necessary to run a large-scale VET-PISA (Programme for an International Student Assessment) successfully. Such development began in 2003, when a research group supported by the German Federal Ministry of Education and Research proposed such a study, the concept of which was published in 2006 (Baethge et al. 2006). The starting point largely stemmed from the dissatisfaction with the political discussion of VET on the European level (e.g. the EU Lisbon and Copenhagen declarations) and with accounts of “competence” or “competency” and the proposals to develop a European Qualifications Frame (EQF) and a corresponding point system (European Credit Transfer System for Vocational Education and Training [ECVET]) (see Winterton 2009).

This endeavor, however, neglected and continues to neglect a scientifically-based operationalization of those concepts, as well as an assessment dimension, leading to many discussions but little corresponding activities. Recent examples demonstrate that neither EQF nor ECVET provide a basis to promote informed political or effective practical decision making. In Germany, this means the inability to define and coordinate consensually and adequately the levels of the “Abitur” and of acknowledged apprenticeships.

As a consequence, the research group developed a large-scale assessment of VET following the TIMSS and PISA approaches for the compulsory school system. The purpose of this study is to operationalize the competencies necessary to fulfill tasks in workplaces and, thus, to provide results regarding required levels of VET, which also could help define valid and reliable levels of the EQF and ECVET.

As a first step to test the design empirically, an expert group consisting of members from eight European countries, conceptualized a feasibility study. The goal was to arrive at common occupational tasks and qualification requirements as a basis for the formulation of test items (Baethge and Arends 2009). At the same time, the group began the project to determine whether the action and activity components of vocational competence could be measured in a reliable and valid way.

We report on selected aspects of these processes, including their consequences and results. The central goal of these aspects was to support all endeavors to promote VET on all levels by monitoring their effects. This seems to be a necessary condition for efficient and effective development of VET, which tackles the promotion of the individual and the provision of necessary human resources on the societal level.

48.2 Vocational Education and Training (VET) in a Globalized World

The economy, as well as social and political conditions, is affected by so-called “megatrends”. That is, countries must cope with increasing internationalization and globalization of economic exchange relations on the markets for goods, services, and labor. Further affecting the economy are the combined growth of the European nations, the increasing importance of knowledge within work processes, and the progressive use of information and communication technologies.

Discussion of these processes began decades ago (Mertens 1974; Buttler 1992, 2009; Achtenhagen et al. 1995; Achtenhagen and Grubb 2001; see also Winterton 2009) and led on the political level to the EU declarations of Lisbon and Copenhagen. Because the EU treats such phenomena as decisive point of economic development and social policy, it tried to foster solutions with the development of the European Qualifications Frame and the supporting ECVET (Winterton 2009). Our review of the literature has uncovered research on the need to bring together individual capabilities and workplace necessities under the headings “key qualifications” or “competences/competencies” (e.g. Nijhof and Streumer 1998; Rychen and Salganik 2003; Rauner and Maclean 2008; Malloch et al. 2011). In addition to the more theoretical literature, we find approaches on the empirical operationalization of central concepts (e.g. Spencer and Spencer 1993; Peterson et al. 1999; Oser et al. 2009; Scott and Reynolds 2010; Griffin et al. 2012). Some major questions remain however:

- (a) How should the competence concept be embedded in the different political and institutional “regimes” (Busemeyer and Trampusch 2012)?
- (b) How should the goals for the necessary teaching/training and learning/working processes be formulated?
- (c) How should the instructional frame of the teaching/training and learning/working processes be described, including that for informal learning?
- (d) How should all relevant variables be operationalized as essential parts of the assessment procedures? – This question urges consideration of the prerequisites of the curriculum–instruction–assessment triad (Pellegrino 2010; Achtenhagen 2012) that goals, instructional processes, and assessment tasks should have a comparable, interrelated complexity.

In the fields of VET, we find that research tends to overemphasize goals and instructional structures but largely ignores assessment processes. As we mentioned, one consequence is that the actual proposals of the EQF and ECVET have been impeded by rhetoric, and thus empirically proved criteria of how to relate work structures or individual “competencies” to these frames are lacking. In Germany, a typical example is the inability to relate examinations in the compulsory school system to the vocational training system reliably and validly. Therefore, the proposal of a large-scale assessment for VET (Baethge et al. 2006) is geared to the assessment dimension, emphasizing the necessity of undertaking research steps comparable to the international studies for compulsory schools. In the following, we demonstrate the steps of a first convergence to the corresponding standards.

48.3 Necessity and Possibility of an International Comparison of VET

The European Commission has acknowledged the severe problems in VET. Therefore, it has increasingly participated in education and the labor market, especially in the development of corresponding competencies, to reach the assessment goals.

Practical implications of the difficulties in measuring such competencies are reflected in the ongoing progress towards the development of a standardized EQF. Comparison of qualifications necessarily centers on the teaching/training and learning/working dimensions of VET with regard to the development of occupational competencies. This is the decisive dimension of VET compared with the institutional/organizational dimensions. From a political, economic, and educational perspective, it is important to understand how the different VET systems help young people acquire the necessary competencies. This is the overarching objective of the EQF and its national differentiations.

Therefore, a central task is to assess such competencies on the micro-level in an objective, reliable, and valid way, as well as to link the results to the macro- and meso-structural factors (see Baethge et al. 2006, p. 86). Such a large-scale assessment of VET should be conducted for different countries in a comparable way, in terms of policy and scientific aspects.

From a policy perspective, such an assessment can improve knowledge related to steering and controlling VET, particularly with regard to: (1) the relationship among individual/biographical characteristics, educational programs, and competence development; (2) the link between the outcomes of comparative competence measurements and institutional orders of VET systems (revealing strengths and weaknesses of different VET organizations in different countries); (3) the interrelationship between certificates of final examinations and the competencies assessed; and (4) the classification of different examinations in VET in international systems of classification (e.g. International Standard Classification of Education [ISCED], EQF) to improve methods of certificates at the European level.

From a scientific stand point, such an assessment can lead to deeper insights into generating hypotheses as well as a valid and reliable mix of methods for an internationally comparable longitudinal study of different VET organizations. The development of valid and reliable methods to compare the performance of different national VET systems could be considered an independent scientific goal, particularly a cross-sectional pilot study. Moreover, from a content-related point of view, such an assessment could result in a better understanding of the relationship among the level of competencies, educational programs, and context variables, the different competence dimensions (generic, cross-occupational, and vocational subject-specific), and the vocational competencies and outcomes in the labor market and on employment.

One main research question for such international comparison is to determine how suitable measurement tools can be identified. Different from international large-scale studies in compulsory academic education, such as TIMMS (Third International Mathematics and Science Study) or PISA, a comparable VET study must take into account individuals' performance at the workplace and in the labor market as well as practical aspects. The reasons are that measurement of workplace learning is always primarily action- and activity-related and actions and activities in the field of VET are very specific—not only with regard to the national scope of occupations but also in terms of the differences between different countries and the occupations themselves (Rauner and Maclean 2008; Malloch et al. 2011; Busemeyer and Trampusch 2012).

An international comparison of VET must be based on a common understanding of the goals of VET. This common understanding cannot be implicitly postulated, but must be mutually developed from a scientific research and policy perspective. Although goals for VET can be based on a relatively narrow approach, focused on the required workplace skills, this restricted view covers neither modern approaches of education nor the ability to train the workforce (Griffin et al. 2012). Therefore, a broader approach that incorporates in addition to subject-related competencies the skills individuals need to participate effectively as members of a flexible, adaptable, and competitive workforce over the course of their lives is necessary. In accordance with the ongoing scientific discussion, educational systems must address three central goals at the systems level (Baethge et al. 2006, p. 11):

1. The development of individual occupational adjustment from an individual user's point of view, taking self-regulation and autonomy into consideration;
2. the safeguarding of human resources in a society, and
3. the warranty of social share and equal opportunities.

These goals were formulated at two international workshops with experts from 17 countries (including the US and Australia) as well as from the CEDEFOP (Baethge et al. 2006, p. 130ff). They function as reference points for the definition of competencies as goals and results of VET. To measure and compare the performance of national VET systems regarding the three goals and to be able to connect them with institutional structures and input criteria, we must solve at least three methodological problems:

First, with regard to the differences in job classification schemata in the participating countries: how can occupational fields and work activities be identified and internationally related to each other? Second, how can vocational competencies be measured and compared? Third, how can the relevant micro- and macro-structural conditions of the VET systems in different countries be analyzed and compared? For space reasons, we discuss only the first two problems (for discussion of the third, see Baethge et al.'s (2006) analyses).

48.4 The Competence Dimensions of VET

One of the main research questions of an international comparison of VET is identifying and determining suitable tools for the measurement of competence (Baethge et al. 2006). Competence measurement in the fields of VET is more complex than that in compulsory education. Whereas TIMSS and PISA are limited to assessing the mathematics and science performance of fourth and eighth-graders and the literacy, numeracy, science, and problem-solving performance of 15-year olds, respectively, a comparable VET study must take into account not only individuals' performance in the workplace and the labor market but also practical aspects (e.g. motor skills, dexterity; Achtenhagen and Grubb 2001). Moreover, international student assessment programs such as TIMSS and PISA are based on well-grounded

research traditions and internationally validated concepts, such as the world curriculum for mathematics. In contrast, a VET study cannot draw on comparable concepts from the structure and development of vocational expertise in various occupational fields. The difference between measurements in VET and compulsory/academic education stems largely from two aspects:

First, measurement in the field of VET is always action- and activity-related. A reliable and valid measurement of competencies must take into consideration, in addition to the cognitive dimensions, the dynamics of economic reality, which includes a series of acts and decisions. Following the work of Gelman and Greeno (1989), we characterize the understanding of real-world dynamics as a set of knowledge structures that lead to the successful performances of learners.

Furthermore, with VET, static-linearized points of views of operational reality must be given up and a systems-oriented approach to business studies should be pursued. A systems orientation means to expose the connections among different topics, concepts, and instruments and to integrate the different elements of knowledge into a meaningful whole so that the manifold specific and dynamic relations are open for observation and treatment. This systemic view of business studies must be complemented by a process-orientation. Measurement must necessarily consider this systemic, dynamic view (Winther and Achtenhagen 2008). Finally, recent research shows that the link between cognitive goals and knowledge of self-related functions has gained more importance over time (Anderson et al. 2001).

Second, actions and activities in the fields of VET are very specific, not only with regard to the national scope of occupations, but also in terms of the differences between different countries and occupations themselves (Rauner and Maclean 2008; Busemeyer and Trampusch 2012). The variety and heterogeneity of occupational specializations, even within one society, make it difficult to reach an international agreement on consistent competence standards. The discussion on the NVQ in the UK, for example, indicates the necessity of developing theoretically well-elaborated modes of measurement corresponding to a broad spectrum of vocational needs of the whole national economic system as well as to individuals' personal development (Achtenhagen and Weber 2008; Keep and Mayhew 2008; see also James 2008). For example, an analysis on car repair at the European level revealed fundamental differences: whereas in one country only one individual was necessary to fix a car, in another country up to ten experts were responsible for fixing different parts of the car (Rauner and Spöttl 2002). Thus, neglecting this difference in an international comparison on car repair would generate wrong conclusions.

In the context of VET, no research has developed comparable, internationally valid concepts of the structure and development of vocational expertise in different occupational fields. Recent approaches are the previously mentioned development of an EQF and ECVET (Winterton 2009; see also reports on comparable approaches worldwide by Rauner and Maclean (2008) and Malloch et al. (2011)). A VET study could complement these approaches and provide solutions based on well-grounded scientific support.

The impact of curriculum-based objectives also must be reconsidered because of the differences between national labor markets and cultures (Busemeyer and Trampusch 2012). Thus, from a political and institutional perspective, the question

of how to compare curriculum content and objectives is one of the central aspects in a VET study because it simultaneously considers aspects of assessment and research on learning and instruction.

In the following, we show step by step how such a construct can be theoretically and practically developed. We also show how corresponding test items can be formulated and presented in a technology-based way and how such procedures can lead to interpretable results.

48.5 Vocational Competence: Dimensions of Complexity and Tasks

Regarding the dimensions of complexity and tasks, the measurement of vocational competence needs a comprehensive and multidimensional construct (see Fig. 48.1). Our proposal stems from an analysis of the evaluation studies of Spencer and Spencer (1993), Nijhof and Streumer (1998), Peterson et al. (1999), Rychen and Salganik (2003), Oser et al. (2009), Scott and Reynolds (2010), and Griffin et al. (2012). A VET study must focus on at least three different *competence building blocks* and their interrelationships (see Greeno et al. 1984; Wilson 2005):

1. Conceptual competence corresponds to factual knowledge, such as knowledge of facts, structures, and knowledge nets that can be transmitted into action schemata;
2. Procedural competence refers to the application of knowledge, such as how to operate with facts, structures, knowledge nets, and their corresponding elements;
3. Interpretative competence connects the features of problem setting with the goals of the learner.

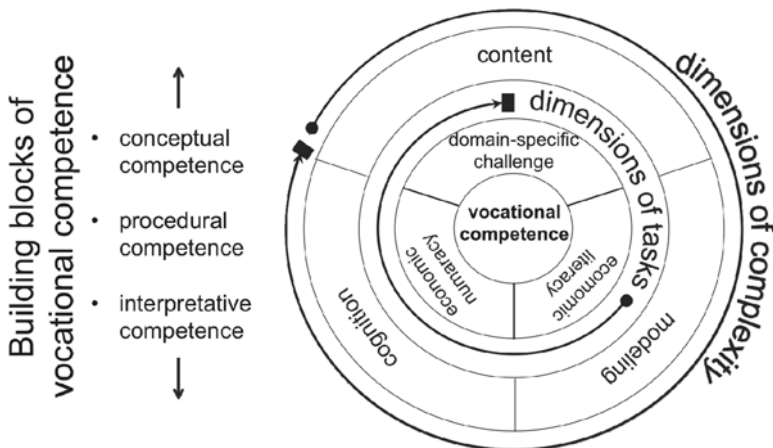


Fig. 48.1 Building blocks of vocational competence (see Winther and Achtenhagen 2009)

Each building block of competence corresponds to different *dimensions of complexity*. Is an occupation-specific task familiar to the learner? Is that task practiced in school and work or simply structured in a way that many learners can be successful in carrying out the task? Use of different dimensions of complexity as a heuristic reference model assists researchers in identifying specific hurdles in learning and performance. Furthermore, use of different dimensions of complexity provides indications of how a task should be designed for increasing complexity and, thus, for more chances of success. The importance of these assumptions corresponds to the discussion on the ‘low-skills/low-quality’ equilibrium (Keep and Mayhew 2008), as such approach is more broadly conceptualized than, for example, the NVQ criteria (Achtenhagen et al. 1995; Achtenhagen and Weber 2008).

- *Modeling* refers to learners’ understanding of and learning processes with regard to performance situations in specific settings in school and in the workplace—in the tradition of applied cognitive psychology (see Glaser 1976; Shavelson et al. 1992; Yuan et al. 2006). By contrasting high-achieving and low-achieving learners, the modeling category can provide insight into learners’ ability to develop and set concrete models that correspond to real-world challenges and tasks and to activate models for solving those challenges and tasks.
- The *cognition* category pertains to Bloom’s taxonomy of cognitive processes and Anderson et al. (2001) revision. Learners’ levels of success correspond to the cognitive process dimension necessary to carry out an occupation-specific task.
- *Content* codes categories of curriculum. This dimension covers both learners’ knowledge base and their realms of experience. Here, learning and coping strategies also come into play. Recent research shows that the link between cognitive goals and knowledge of learning and performance strategies has become more important over time (Anderson et al. 2001).

Such reference models can standardize the performance of learners, so that existing deficits while carrying out the tasks can be determined more easily. The *dimensions of task* focus on labor market requirements (see Winther 2010):

- On the level of *generic occupational* requirements, tasks refer to the collection of required prerequisites to successfully develop occupational identities and solve work-related tasks. Such prerequisites are economic literacy and numeracy. In line with Gelman and Greeno (1989) we interpret both dimensions as *domain linked*. The domain-linked category refers to occupational key skills, which comprise knowledge about specific methods and strategies (Rychen and Salganik 2003). The concepts of literacy and numeracy have long been discussed in international comparative studies on compulsory education (OECD 1995, 2003).
- *Domain-specific* tasks refer to *specific occupational* requirements. These requirements include both job-specific and enterprise-specific skills (see Oates 2004).

To assess such tasks, we recommend designing them as part of technology-based test situations, in line with the concept of the curriculum–instruction–assessment triad (Pellegrino 2010; Achtenhagen 2012). This means that each part of the triad should have comparable complexity: if the curricular goal is to successfully complete a certain task in a firm, the corresponding test item must provide the opportunity to authentically complete such task in the specific test environment. The area of content—generic as well as specific occupational requirements—provides the base for adequately understanding a company and its systemic economic coherences. By constructing the test environment to be computer and web based, we obtain an authentic model of a real-life enterprise. The research group has gained experience in modelling such complex computer-based teaching-learning environments through, for example, simulation games, case studies, simulated (learning) offices, and simulated enterprises (Achtenhagen and John 1992). Curricula in both German commercial schools and in other European countries have incorporated these models.

48.6 Identification of Occupational Fields and Work Activities in the Area of Business and Commerce

A major objective for an international comparison is to determine whether there are common occupational fields and work activities in the different countries that can form a basis for reliable and valid research. The goal is to define the overlapping content dimension in terms of its complexity and connect it with the level of competencies. The first steps in this direction have been a feasibility study with eight European countries (Baethge and Arends 2009), which extends the proposal made for a VET-PISA study (Baethge et al. 2006). The study was executed for four major vocational fields: car mechatronics, electricians, business and commerce, and social and health care. For space reasons, we concentrate here on business and commerce.

One basic difficulty of an international comparison is that the tasks and items cannot be directly taken from the corresponding national curricula. Yet, each country has its own culturally based ‘regime’ of VET (Busemeyer and Trampusch 2012) and, therefore, defines school curricula, qualification requirements, and occupational tasks under different political and institutional assumptions and goal settings. This defining also includes particular perspectives on school and apprenticeship careers of the individual learner who is acquiring the necessary qualifications for task fulfillment at the worksite.

In the process of preparing a VET-PISA in the fields of business and commerce, working groups were established through the use of three instruments: ISCED (UNESCO 2006); ISCO (International Standard Classification of Occupations; ILO 2008), and O*NET (US Occupational Information Network; Peterson et al. 1999).

Table 48.1 Judgments on the relevance of occupational tasks

Occupational tasks (1 = not relevant, 5 = extremely relevant)	Mean of country means	Mean absolute deviation	ICC [2,1] ^a within countries
Prepare invoices, reports, memos, financial statements, and other documents	4.7	0.2	≥0.893
Respond to customer/suppliers inquiries about order status, changes, and cancellations	4.6	0.3	≥0.844
Review files, records, other documents to obtain information to respond to request	4.4	0.3	≥0.849

^aTwo-way random; ICC [2,1] (Shrout and Fleiss 1979)

For the occupational area of business and commerce, the comparative analyses were run by 70 national experts from six countries: Austria, Denmark, Finland, Germany, Slovenia and Switzerland (see Breuer et al. 2009). The groups received agreement from their governments to work together on national and international levels and to participate in a program of research questions (Baethge and Arends 2009). More countries were asked to participate and attended the preparation conferences but did not participate, mainly because of lack of agreements between their ministries of labor and education.

Work activities and occupational tasks in business and commerce are diverse, so decisions had to be made using the different classification schemata: the first decision, defined as entrance level ISCED 3 B, which means a prior compulsory schooling of 9 years and an entrance age of 15 or 16, allows access to the labor market. The second decision was choosing occupations according ISCO 08 category 33. These occupations are related to all forms of VET (e.g. school, practical training, or mixed forms) and, in all countries, take 3 or 4 years to complete. For use of O*NET for judgments on the selected jobs, all occupational tasks were assigned to job zones 3 or 4 (medium or considerable preparation) and to an SVP (i.e. duration of specific vocational preparation) range of 6.0 to <8.0 (which includes 1–4 years of specific vocational preparation).

All the groups agreed that nine occupational tasks were representative for the fields of business and commerce. These tasks are also judged by the different country groups on their relevance (Table 48.1; see Breuer et al. 2009, p. 74).

We emphasize three main tasks that received congruent judgments of high relevance from the groups in all the countries. These tasks also have the highest frequency at the worksite; they refer to common day-to-day work processes of clerks (Breuer et al. 2009, p. 75). Thus, after adequate modeling and item editing, it is clear that these tasks must be integrated into the test instruments for a large-scale assessment in the fields of business and commerce. The following sections demonstrate further steps of competence measurement.

48.7 Match Between Working Processes and Assessment

Because all test items are designed to stimulate respondents' behavior and actions, an analysis of possible behaviors and actions seems necessary. What types of behaviors are conventional in real-world work processes, and how can these modes of behaving be assessed are important questions. These questions also include description of real-world stimuli, labor conditions, tools and supplies for work, and personal abilities. With these requirements in mind, the assessment style for measuring vocational competence can be defined; that is, it must be based on the requirements of the labor market and take into account technology-based real-world items. Technology-based items in a test correspond to real work affordances, on the one side, and reduce the influence of the test environment and tester, on the other side. This statement is based on information about current practical examination, in which many pages of explanation describe tasks. Comparable information can also come from videos, data files, and so on. Therefore, an increase in test objectivity can be expected. In addition, authentic test situations need to account for the situational character of competencies, thus increasing test validity. Furthermore, embedded multi-channel and interactive test stimuli given by video, animation, or authentic tools can increase test subjects' efforts and motivation on working on the test.

For our work, all items are based on real-world working and business processes and define 'challenges' in authentic situations (to construct authenticity, see Achtenhagen 2001; Achtenhagen and Weber 2003; Janesick 2006). The idea behind the use of authentic challenges for assessment is to observe real behavior in test environments as key indicators for vocational competence in real-world environments. This type of assessment is called 'embedded' in classroom assessments (Black et al. 2003). The classroom situation assessment comprises classroom teaching and learning processes; similarly, assessment in vocational situations is embedded in employees' working and developing processes. Therefore, the design of authentic items is based on three separate but dependent models:

1. A model of a real-world *labor market* is used to display interactive processes between individuals and institutions;
2. a model of real-world *business processes* presents concrete business processes in a complex way and describes procedures and workflows within and between different departments or different firms; and
3. a model of real-world *business decisions* measures operation flexibility using practical work examples that lead to concrete decision processes.

In addition, regarding work life requirements in specific occupations, items are designed that stimulate adequate operations in company departments with their specific economic coherences. Items in this category are called 'domain-specific challenges'. Each domain-specific challenge refers to a systemic view of business data and procedures with respect to economic decision-making processes in the fields of business and commerce.

48.8 The Competence Dimensions of VET

As a first step, we developed and tested a competence model for the international context to help judge the results of workplace learning (Achtenhagen and Winther 2009; Winther and Achtenhagen 2009; Winther 2010). We used the results of the international expert groups to develop examples of typical tasks for industrial clerks in concrete enterprises. We observed these actions and then classified them on the basis of their frequency and duration at real workplaces. We presented the elaborated set of tasks and their conversion to test items to experts in the firms (e.g. department directors, experts from the training department, human resource experts, trade union representatives). The experts unanimously judged them as typical for the corresponding workplace tasks.

With regard to a large-scale assessment, a decisive problem arises: the identification, analysis, and evaluation of firm-specific tasks are necessary steps for item development, but firm-specific tasks cannot be added to a large-scale assessment for several reasons. First, they would take too much time and effort to test individual apprentices at firm-specific workplaces (e.g. test control, improper help, one tester for one testee). Second, the comparability of firm-specific tasks with regard to the system level, the confidentiality of the data (e.g. firm-specific calculation of prices), the specific conditions of the firm adaptation of the ERP systems, and the relationship of firm-specific tasks to job-typical tasks all prove difficult in a large-scale assessment.

Therefore, there was a need to ‘clean’ our firm-specific data such that they lost their *firm specificity* but kept their *job typicality*. To do this, we modeled a virtual enterprise and its workplaces in accordance with a real firm and constructed for that virtual enterprise a comprehensive data packet with all means and data necessary to follow realistic business processes. Data included, for example, balances, cost accounting, and prices for different products. There were also descriptions of workplaces for different departments. Because business processes are related mainly to the handling of information and data, it is important, for keeping their authenticity, to transform them in such a way that they are realistic. The tasks to handle the information and data are, therefore, the same as in real firms. This is the basis for testing workplace learning, that is, by using workplaces of a virtual enterprise objectively, reliably, and validly. Experts of the real firms also checked all the tasks to be fulfilled in the virtual enterprise with regard to their typicality. The agreement here was also unanimous.

A final step was to convert these tasks into a web-based format. The technology-based assessment focuses on the meaning, range, and level of specific work-related skills and abilities in the occupational fields of business and commerce. To provide authenticity, content validity, and practical adaptivity during the test, the assessment is grounded on a real company as a benchmark. The modeling requirements are strict. First, a transparent method of production, together with a short parts list of production items, is necessary to clarify the company’s objects also for apprentices/employees trained in other firms. Second, well-known products are incorporated to guarantee identifying marks during the test. With these requirements, the technology-based assessment is based on the metalworking industry. The company

is called ALUSIM Ltd. and fabricates aluminum packaging. The company's products are beverage cans (Coca-Cola), cosmetics (NIVEA), and food grade packaging. Authentic parameters of modeling were used, including company history and reporting (e.g. balance sheet, profit and loss statements, cash flow analyses). Third, authentic large-volume production and its corresponding costs were included, together with real-world customers and suppliers. An important criterion for 'authenticity' was to embed the tasks in processes to avoid unrealistic, isolated, and static handling of tasks.

We constructed the virtual enterprise with workplace tasks of three departments, according to those identified by the international panel: sales department (three sequences of tasks), purchasing department (four sequences of tasks), and production planning department (two sequences of tasks). This also included the development of different technology-based tools such as storyboards of authentic business processes, applications of integrated enterprise resource planning (ERP) systems, including customers and supplier lists, in-depth analyses of the designed company, and so on.

All these products and modeling steps are necessary to stimulate performance in authentic vocational situations and work processes as key elements of competence measuring. In other words, a simulation of real-world conditions ensures a measurement of authentic abilities without bringing the testees into such real-world situations. Therefore, the business simulation contains complete business processes. The focus on business and work processes guarantees the interpretability of the test results. A booklet design provides an acceptable testing tool because business and work processes can be shown in random order and separated in sequences of various interests: sales, purchases, and production challenges, including different work processes for each. Furthermore, in contrast with real-world test environments, a simulation ensures a content-related and cognition-based characterization of the test environment and provides a valid description of personal abilities and item difficulties with regard to concrete test challenges. Therefore, the simulation permits a psychometric modelling approach.

All domain-specific challenges are video based and refer to a complete sequence of tasks (i.e. work processes). The test subjects navigate through the tasks using an interactive desktop (see Fig. 48.2), which encompasses all documents, ERP systems, filings, and helping tools to test the ability to cope efficiently and effectively with the tasks and to solve them.

Observing the user-interface clarifies how the simulation works. Starting the video opens the domain-specific challenge. The assessees watch a dialogue between a trainee and an employee, which contains useful information and a reference to solving the process. However, different work processes structure each challenge. The sales challenge, for example, starts with two steps. First, assessees must enter customer data into the ERP system. Therefore, they must review all relevant customer information, the ERP requirements, and the production process. In a second step, another test situation, the trainee receives information from the production department that the sale cannot be closed on usual terms. The assessee must manage that situation by contacting the customer. The outlined work process demands a



Fig. 48.2 Interactive desktop for technology-based assessment (see Winther 2010, p. 215)

deep understanding of sale records, economic conditions, customer buying patterns, and sensitivities. They must also anticipate the entire production process to find the new delivery date, make the right decision, and inform the customer correctly and (to prompt a long-term relationship with the customer) also politely, which is part of the corresponding test item. Thus, both work processes refer to different complexity levels.

One instrument to check the complexity of test items is the construct map as proposed by Wilson (2005, 2008): ‘Its most important features are that there is (a) a coherent and substantive definition for the content of the construct; and (b) an idea that the construct is composed’ (2005, p. 26) of one or more underlying continua by which the items can be ordered. Figure 48.3 provides a visualization of the continua we used to construct the items: modelling, cognition, and content.

The item-response construct map indicates the qualitative differences in item responses. The framework demonstrates the qualitative structure of levels inherent in the construct that refer to different complexity levels (see Fig. 48.1). The responses to the items help identify response patterns/behavior that vary from low to high complexity.

The *modeling* dimension extends from no to complete modeling. Its complexity depends on (1) the level of familiarity, (2) the level of practice, and (3) the structured hints given in occupation-specific settings. Whereas the levels of familiarity and practice are strongly related to personal conditions, the measurers can determine structured hints. Reducing the hints in a specific setting increases the complexity of the setting. In response, the learners must build a model of the task using their cognition. Expanding the hints improves access. The score level of learners’ responses extends from incorrect modeling (Level 1) to advanced modeling (Level 4). An incorrect model contains a reference to some appropriate terms or concepts without any understanding of the system and its coherences,

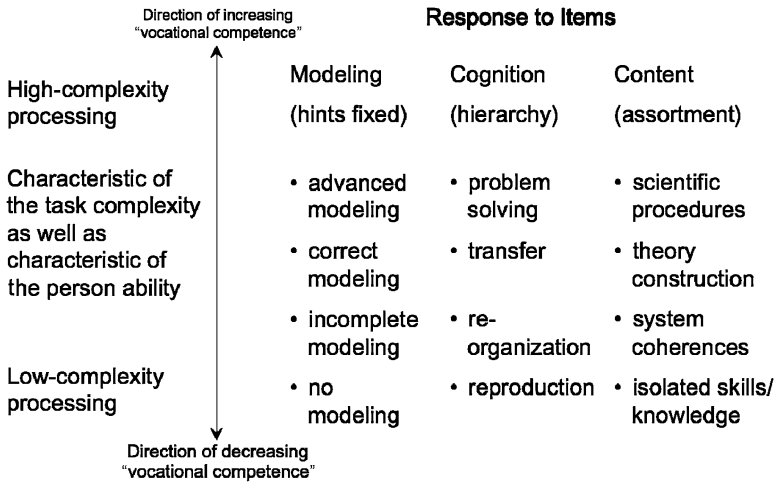


Fig. 48.3 Construct map for 'vocational competence'

and the advanced model includes all expected relevant terms and concepts and goes beyond them as well.

Regarding the *modeling dimension*, both the 'enter' process and the 'react' process are the same. The work processes assume that a correct model of sales procedures, production, and customer services is known.

The *cognition dimension* ranges from reproduction to problem solving. Learners' cognitive processes depend on both understanding and the ability to act. The major idea behind this taxonomy is that what measurers want learners to know and what they want to measure can be arranged in a hierarchy from less to more complex. Using the cognition category, the measurer can discriminate learners on the following levels: on Level 1, the reproductive level, a learner simply has the ability to describe and replicate some characteristics of matter. Doing so indicates the learner's ability to reproduce the specific task. The learner does not use other perspectives and ideas. On Level 2, re-organization, learners begin to combine and interpret task-related facts and concepts with a more global view. On Level 3, the transfer level, learners apply all relevant facts and concepts. They are also able to transfer relevant task-related information to make their decision in an integrated and well-founded way. Level 4, problem solving, involves goal-directed thinking and action in concrete occupation-specific situations. Learners self-organize their problem-solving process, which includes selecting the best solution for upcoming economic developments and strategic decisions and also weighing intended main effects and possible unintended side effects.

Regarding the *cognition dimension*, the first work process (enter process) refers to level 2, the re-organization level. Assesseees must combine and interpret task-related facts to solve the task. The second step (react process) stimulates the problem-solving level (level 4). Depending on their experiences, trainees must self-organize an unusual situation, including selecting the best solution for upcoming

proceedings and economic developments with respect to the company's objectives and customer preferences.

The *content* dimension varies from isolated skills and knowledge to scientific techniques and procedures. The measurer can select a representative assortment that includes content from low to high complexity. The content dimension in increasing order is as follows: the development, enlargement, and deepening of basic economic skills and knowledge (i.e. Level 1); the development, enlargement, and deepening of the understanding of system coherences in the economy and basic principles of micro-economic and macro-economic behavior, considering also ecologically and socially relevant effects (i.e. Level 2); the ability to have a systematic point of view on micro- and macro-economic coherences in exemplary representations as well as approaches of economic theory (i.e. Level 3); and the development, enlargement, and deepening of fundamental scientific working techniques and procedures (i.e. Level 4).

Regarding the *content dimension*, the enter process in agreement with the company's production process focuses on understanding system coherences and the basic principles of ERP systems. Therefore, the work process lies in Level 2, system coherences. The react process also requires the ability to understand system coherences. In addition, the work process also focuses on the coherence between individual and institutional conditions of the market from a more micro-economic point of view (level 3, theory construction).

In addition to defining learners' responses at each level of the continua of modeling, cognition, and content, the test format and design help clarify the expected differences between levels; this also includes the notion of common errors when taking the test (Wilson 2008). However, the presented construct map of vocational competence successfully serves as a framework for item design and a method to make measurement possible and diagnoses interpretable. Six independent judging experts classified each item/task before the field phase according to the level of each of the three dimensions. All judgments were discussed with the goal to reach a commonly accepted classification.

All items are designed to generate diagnoses of test subjects' responses. Therefore, another check was performed with regard to the distribution of the tasks' difficulty within one task class and between the three task classes of sales, purchases, and production planning. Response behavior is coded with respect to the different complexity dimensions of the construct map and depends on the concrete item. Thus, the task differences help identify ability differences, and vice versa.

48.9 Evaluation

All different actions to be fulfilled within this virtual workplace are assigned to test items. The quality of the corresponding actions is coded per item (as 0/1 or graduated). The test consists of 34 items related to the fulfillment of actions on typical workplace tasks (18 items: purchase; 12 items: sales; 4 items: production planning).

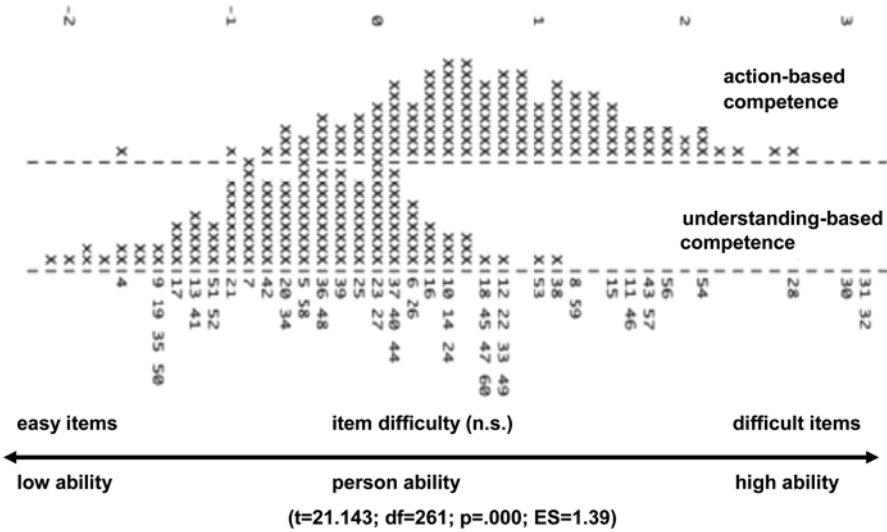


Fig. 48.4 Wright maps for action-based and understanding-based competence

In addition, we constructed 26 items to test the comprehension of the different applications within the virtual enterprise ALUSIM (11 items: purchase; 12 items: sales; 3 items: production planning). The goal was to evaluate whether such items can be used for a large-scale assessment in VET. The study was run in 15 classrooms in seven commercial schools in three German states. The sample comprised 264 testees in their third year of apprenticeship (of industrial clerks: = Industriekaufmann/-frau), which consists of 2 days per week in the commercial school and 3 days per week at the workplace. Of the testees, 56.5 % were women; 83.4 % were between the ages of 20 and 23 years.

We applied the multidimensional random coefficients multinomial logit model (Adams et al. 1997) using the software Conquest (Wu et al. 2007). All model fits were in the prescribed range. Figure 48.4 shows the Wright maps for the action-based and understanding-based items.

We tested the plausibility of this two-dimensional solution (difference of deviance=101.91; df=3; $p < .001$). The EAV/PV reliability for action-based items is .762, and that for understanding-based items is .705; both values are considered very high with regard to the number of items and test subjects. The Wright maps demonstrate that the testees solve the action-based items better than the understanding-based items (crosses indicate test subjects, numbers indicate the test items). The advantage of this solution is the separate presentation of abilities of the testees and the difficulties of the test items. Figure 48.4 shows that we succeeded in constructing the tasks and items; their distributions confirm adequate differentiation according to people’s abilities and the difficulties of items.

Table 48.2 Level model of competence

Level of competence	Thresholds of each level	Number of test subjects on action-based competence dimension (in %)	Number of test subjects on understanding-based competence dimension (in %)
Beyond level I	-1.479	3.10	35.50
Level I: Receptive vocational competence	-0.723	19.50	42.70
Level II: Action-oriented vocational competence	0.117	52.70	21.40
Level III: Analytic vocational competence	1.410	23.30	0.40
Level IV: Decision-oriented vocational competence	3.538	1.50	–

One goal of this procedure is to define levels of the competence dimension. The PISA studies on compulsory subjects demonstrate this endeavor. We also tried to define such stages by following the work of Hartig (2007). A regression analysis was performed, in which the dependent variable for each item is given by its logit determined by the CONQUEST program and the independent variables are given by the averaged expert ratings on the three dimensions of the construct map for each item. Table 48.2 shows the results.

The thresholds of each level of competence are marked by the corresponding points on the logit scale (i.e. the values on the logit scale are marked by the numbers at the top of Fig. 48.4). If we define competence Level 2 as the goal level of the apprenticeship of industrial clerks, we can show that 77.5 % of the apprentices reach this action-based level in their third year of apprenticeship, about 6 months before their final examination (which is administered externally by the Chambers of Industry and Commerce), whereas this level is reached by only 21.8 % for the understanding-based items.

The apprentices had completed two and a half years of their 3-year apprenticeship, which corresponds to 83 % of the entire apprenticeship. With regard to action-based competence, this value is reached. The final examination delivers a certificate that is valid throughout Germany (and also acknowledged in Austria), so the remaining time before graduation is characterized by high activity by both the apprentices and the firms: apprentices with good grades expect to get a job immediately in their enterprise or in a related area; firms want their apprentices to get good grades to signal their training quality and to achieve (especially regional) social recognition. In turn, this influences the demand for training in the individual firm and increases the chance for a better selection of apprentices. The value of 21.8 % for understanding-based competence is unexpectedly low. The corresponding items were taken directly from the goals and content of the official school curriculum and training regulations and are normally taught. The items refer less to the international dimension, as in the case with the action-based items, and are more related to Germany's regulations by law. The validity aspect was thoroughly checked. One explanation, which was

also addressed by principals, teachers, and trainers, and the officials of the Chambers of Industry and Commerce, is that the large amount of subject matter remains an ‘inert knowledge’ (Renkl 2007). It is common about 1 month before the final examination for the schools and the Chambers to hold intensive crash courses to turn this inert knowledge into a movable and usable one. Trials to measure the effects of such special treatment on the final examinations are necessary. Analyses of the item difficulties and also of the subjects’ abilities were run in accordance with item response theory and provide hints on where apprentice learning problems are located and, thus, on the goal-oriented measures of teaching and training.

48.10 Conclusions

The results demonstrate that it is possible to assess the effects of workplace learning by means of a web-based virtual enterprise. The approach enables testing of 20–25 learners simultaneously (depending on the size of computer laboratories) at one point in time and therefore provides a basis for running a large-scale assessment. A major outcome of this approach is the development of a competence model of workplace learning, which can provide practical intervention as well as a mode of comparison of the effects of workplace learning at different workplaces through an international large-scale assessment. Our research shows that it is possible to define a set of commonly acknowledged, relevant occupational situations.

According to TIMSS and PISA, vocational domain-specific competencies should be reported mainly through scale scores derived through the use of item response theory scaling. This approach describes the performance of a sample in a subject area to be summarized on a common scale or series of scales, even when different items have been administered to different people. In turn, this process brings the performance of people from different cohorts together on a common scale, even those who have worked on different test formats.

International comparison of occupational domain-specific competencies is a new concept. Thus, new tests must be developed for domain-specific competencies in the vocational area of interest. The proposed item format is a realistic challenge in a computer-simulated work environment. The main advantage of this format is (face) validity; the test reflects professional tasks that are common in the vocational area. This format also ensures that the test measures the concept it is intended to measure.

The web-based format, together with the complex teaching-learning environment, also helps reduce the reading time of the tasks. For the traditional final examinations, apprentices receive comprehensive descriptions of complex business processes, which need a lot of time and reading literacy (Winther and Klotz 2013). Another advantage of the computer-simulated format is that students enjoy taking the test, which in turn will enhance the quality of the solutions. One main disadvantage of the computer-simulated format is the relatively long assessment time. At least twice the time of a short multiple-choice format is required to finish the test,

to achieve the same measurement precision of the items. Because the measurement error requirements are relatively low, the test length will still fit the time restrictions, which are reasonable in a large-scale assessment.

With regard to these results, an initiative supported by the German Federal Ministry of Education and Research began in 2012 to develop the instruments and the research and measurement steps further. The goal of the ASCOT project (Technology-based Assessment of Skills and Competencies in VET) is to promote the implementation of an international large-scale assessment in VET.

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