Chapter 27
Researching Professional Learning in Complex Environments: Opportunities and Challenges from a Qualitative Research Perspective

Monika Nerland

Abstract This chapter discusses the contributions in the edited volume *Methods for Researching Professional Learning and Development: Challenges, Applications and Empirical Illustrations* from a primarily qualitative research perspective. The discussion takes the different methodological challenges or shortcomings that the chapters aim at addressing as a starting point, and moves between the suggested methods to discuss opportunities and limitations. A recurrent challenge is to find adequate ways to approach and delimit work practices within which learning unfolds, especially when work becomes multi-sited, interlinked in network constellations of actors and practices, and possibly black-boxed through the use of various information systems. In these efforts, a variety of theoretical and methodological approaches is needed. This edited volume is a valuable contribution to methodological discussion and awareness, which, through its various chapters, provides condensed introductions to various approaches as well as examples of how the given approach has been used in studies of professional learning or development. A suggested way forward is to establish more strategic connections to other research fields that take an interest in work-related learning and development, such as organisation studies, information system research and infrastructure studies.

Keywords Professional learning · Professional practice · Professional expertise · Digitalisation · Transformation of work · Qualitative research

M. Nerland (✉)
Department of Education, University of Oslo, Oslo, Norway
e-mail: m.b.nerland@iped.uio.no

27.1   Introduction

This book emerges from the challenges faced today by research on professional learning and development (PLD), and more specifically from an envisioned need to broaden the methodological repertoire and keep up with recent methodological opportunities that are yet to be adopted in a more widespread way in this field of research. The aim is, therefore, to provide an overview of less-established and emerging methods that are relevant to research on professional learning. The value of such a collaborative initiative is at least threefold: First, any research field should aspire to keep up with methodological innovations in its wider research context, in this case in the social sciences and in educational research more broadly. Second, when the focus is on professional learning and development, there is a need to adapt research topics and methodological approaches to the ongoing changes in the organisation of professional work. It is generally acknowledged that important professional learning happens through participation in work practices. How work environments offer opportunities for learning at work is, therefore, of great importance, and research needs to keep up with important changes in these environments. Third, any research field would need to monitor the development of the field and facilitate internal knowledge-sharing for further advancement. Initiatives such as the volume presented here are a welcome opportunity to see the field of PLD research from a methodological point of view and to consider how it develops from within and relative to its neighbouring research areas.

Methodological innovations have different origins. One driver for change is the new opportunities for data gathering and analysis that come with digitalisation. This includes opportunities to make productive use of larger datasets and automatically generated data flows, as well as data generated from the use of advanced tools and instruments in work practices. Further, methodological advancements can be driven by changes in the phenomenon under examination—in our case, PLD—that call for a rethinking of the unit of analysis and approaches to collecting and analysing data. For instance, new ways of organising work and employment may call for approaches that better grasp phenomena such as multi-sited work practices, or the emergence of self-employed careers in the platform economy. Third, methodological innovations may develop cumulatively through the refinement and perfection of long-existing approaches. Here, advancements can be driven by a need to strengthen the transparency of the approach to enhance the credibility, or by efforts to improve its ecological validity. A fourth driver of change relates to the shifting notions of research and its contribution to society. For instance, the current emphasis on user involvement in research and the growing orientation towards analytics in organisational life may both, yet in different ways, encourage interventionist methodologies and soften the boundaries between research activities and other spheres of professional life.

The chapters in this volume relate to these driving forces in various ways, and take different challenges or unexploited opportunities as their starting point.

Although the current chapter primarily discusses the contributions from a qualitative methodological point of view, it becomes clear through several chapters that methodological advancements in part seek to overcome this division. The organisation of the volume in its three parts highlights methods for data collection, data analysis, and broader research approaches, which in itself is an interesting manifestation of differences in methodological concerns. Part I addresses methods for data collection, comprising chapters on both qualitative and quantitative approaches that seek to explore data sources that can complement or expand our understanding of individuals' learning or experiences. Part II, addressing methods for data analysis, is largely focused on quantitative approaches. Part III presents several qualitative approaches that typically include a broader set of organisational processes and relations in their units of analysis. Some chapters in this section also address interventionist and participatory research designs.

The positioning of contributions in the different sections of the book may reflect dominant concerns in the two main approaches. Qualitative research is often characterised by taking social processes and experiences, and how these are created and given meaning, as their objects of enquiry. Denzin and Lincoln (2018, p. 10) described qualitative research as "a set of interpretative, material practices that make the world visible", highlighting how researchers interpret the social world by enacting a set of material practices to represent, explore, and make sense of social phenomena. Qualitative research can be directed towards processes as they unfold, towards personal experiences, and towards characteristics of specific social environments. However, the focus of the analysis will often include relations between dynamic processes and entities as they unfold in situ or are experienced by practitioners. Hence, the ecological validity of the research and whether the research design offers an adequate reduction of the social world are recurrent concerns. The predominance of quantitative approaches in Part II of the book may reflect the relatively stronger emphasis on techniques for achieving reliable measures and enabling replicability through these procedures. This may also reflect the fact that qualitative approaches will less easily separate between data collection and analysis as distinct processes, as these often become intertwined in ongoing explorative and interpretative work.

In the next section, I will discuss the contributions in this book from a primarily qualitative research perspective. However, recognising that research on PLD often makes use of several data types and procedures, I will also include some comments on initiatives that combine qualitative and quantitative approaches. I will take the different challenges or shortcomings that the chapters aim at addressing as a starting point and move between the suggested methods to discuss opportunities and limitations. In Sect. 27.3, I relate the discussion to changes in professional work that in different ways pose new challenges to research on PLD, before the chapter concludes with some reflections about future developments in this field of research.

27.2   The Contributions: Problems Addressed, Insights Generated

A common interest in several of the chapters is to better grasp manifestations of PLD in the situation where they occur, and to account for contextual features that shape learning and experiences in situ. The problem of relying on self-reported data in retrospect when making claims about learning situations and processes has been explicitly raised by several authors (Cuyvers et al., 2022, Chap. 26; David et al., 2022, Chap. 9; Lemmetty et al., 2022, Chap. 18; Rausch et al., 2022, Chap. 3; Paloniemi et al., 2022, Chap. 5). Finding ways to generate rich data about PLD processes as they unfold is thus an important methodological challenge. Qualitative approaches are, in principle, well suited to meet these demands. The methodological toolkit offers opportunities for recording actions and interactions, logging experiences, or narrating accounts as they emerge, as well as approaches to analysing processes of work and learning in their sociomaterial context. The problem is that such forms of data generation are often time consuming and may disturb the work practices themselves by asking participants to generate accounts as they go, or by having one or more researchers present in a participatory observational mode. The chapters examine and discuss several alternatives for addressing these challenges.

27.2.1   Studying PLD Through the Practices and Experiences of Individual Professionals

Two of the chapters present different ways of using diaries as an approach to collect and analyse professionals' experiences related to their work environments. The chapter by Rausch et al. (2022, Chap. 3) suggests that diaries can be useful for uncovering the informal and often unconscious aspects of learning at work, illustrated by studies that prompt workers to report during work by way of paper-based forms or voice recorders. The Rausch et al. show how diaries can take a range of forms and purposes and advise the use of short scales and single items to enhance efficient registration. One question in this regard is the extent to which the format of reporting can or should be predefined by the researchers. Events and experiences can, as this chapter illustrates, be logged to gain information about their occurrence and frequency, and how this varies across groups or situation types. However, if the research interest is how informal learning processes emerge, it may be difficult for the researcher to predefine situations and categories for reporting such information— and especially so in complex work environments, which I will discuss later. Leaving participants to decide what events are significant and worth reporting may be an alternative, however at the cost of comparative opportunities. The chapter by Vähäsantanen and Arvaja (2022, Chap. 17) also discusses the use of diaries; however, in this case, it is combined with interviews to perform narrative analyses of professionals' identity construction over time. The use of diaries (and interviews)

to gather narratives has the potential to generate in-depth analyses of how professionals understand themselves and how this might shift over time and with different work environments. As Vähäsantanen and Arvaja argue, such self-understanding matters for learning and agency. Especially in transition phases that involve shifts in work positions and identities, such a narrative approach is suitable. An in-depth account of learning situations and processes as they occur at work would need a rich description of the relationships between tasks, work processes, and work environments, which may or may not be sufficiently captured in the participant-generated narratives.

Another related interest in several chapters is to expand the analytical focus in research on learning experiences to include emotional and embodied dimensions, in addition to the often foregrounded cognitive dimension. Two chapters explore the opportunities for combining more traditional qualitative data sources with the use of new technologies for measuring brain activity and its neural basis (Paloniemi et al., 2022, Chap. 5; Silvennoinen et al., 2022, Chap. 7). These chapters clearly present emerging opportunities for researching aspects of the human learning experience by integrating methodological tools and technologies from neurosciences. However, the methods have limitations regarding researching PLD as an emergent, processual phenomenon, especially concerning learning as intrinsic to work practice. For instance, although measures from electromodal activity may help identify emotions that are in play in specific experiential or stimulated situations, it is not yet clear how these emotions matter for learning processes that unfold over time.

Cuyvers et al. (2022, Chap. 26) take interest in PLD as an emergent and processual phenomenon that is "entirely integrated with work" (p. XX). They specifically focus on how professionals' self-regulated learning in work situations can be studied. Cuyvers et al. (2022, Chap. 26) propose what they term a longitudinal, multiple case study approach, in which the individual professionals serve as cases, and data are collected through direct observations of professionals in work situations combined with immediate stimulated recall interviews. By using a 'shadowing' technique to follow individual workers in and across various work situations, researchers can observe how PLD unfolds in different events as a work-integrated activity, while the professionals' intentions and strategies for self-regulation are further explored in the stimulated recall interviews. This approach is productive in accounting for the situated actions as they occur in everyday work situations and at the same time generating data on metacognitive processes. It can be used for different research interests; for instance, quite a few studies in the field of organisation studies have combined the shadowing of persons with forms of immediate interviews or stimulated accounts to examine the work practices of specific organisational actors. We could imagine other research topics in PLD research as well, for instance, how professionals (learn to) use new technologies in their work environments, or how they develop strategies for working with clients or user groups. One question, however, is what qualifies research designs to be longitudinal. In the study presented by Cuyvers et al. (2022, Chap. 26), the practitioners ($N = 13$) were observed 4×4 h on average, distributed on different working days. Although the approach certainly generated a rich and voluminous data set, it seems to provide a

better basis for investigating variations in the self-regulation of professional learning across work settings than for following developments in their strategy use over time.

27.2.2   Accounting for Interactional Processes and Organisational Relations

While the above-discussed chapters take individual professional learners as their focal point, some contributions take interest in learning as a collective and interactional accomplishment, hence focusing on the dynamic interaction in teams or groups as their unit of analysis. David et al. (2022, Chap. 9) focus on the temporal dimension of team learning by investigating the interaction dynamics of teams understood as changing patterns of micro-behaviours emerging in teamwork. The authors discuss how micro-behaviours can be understood and coded on different levels of temporal resolution, subjected to different (also quantitative) analysis techniques. An interesting question is how micro-behaviours and their role in the dynamics of interaction become re-represented through coding schemes. The proposed techniques will offer different opportunities in this regard. From a qualitative research perspective, a common distinction is made between 'categorisation strategies' and 'connecting strategies' in the analysis of social phenomena (Maxwell & Chmiel, 2014).

The first relates to strategies for examining similarity-based relations by comparing and contrasting, whereas the second examines contiguity-based relations by analysing the connections between elements and how they work on each other. In other words, what is split up through the coding processes and what is kept together as meaningful units of data is a critical issue. Here, it is interesting to consider the chapter by Filliettaz et al. (2022, Chap. 19) as a different approach to analysing social interaction. These authors propose a video-based interaction analysis that builds on principles from micro-sociological approaches to studying communication in work situations. These methods have a long history in workplace studies, where the ongoing coordination, negotiation, and accomplishment of joint work processes have been a main interest. In the chapter by Filliettaz et al. these methods are discussed in the context of adults' learning at work. As a first phase, the researchers conduct a video-ethnographic enquiry through which selected and significant work situations are recorded. Next, these recordings are used within the frames of an interventionist design, where video recordings of participants' work situations serve as a means for analysing the interaction together, which in turn stimulates the professionals' awareness and learning of interactional competencies. In this way, recorded work situations are used in formal training sessions with PLD as a stated aim, and the methods serve both research- and practice-related purposes.

One critical question to this approach, which is also discussed in the chapter, is how and to what extent the participating professionals can adopt the (relatively advanced) principles of performing interaction analysis together with the

researchers. Such analyses often require extensive training and theoretical understanding. Therefore, one may consider the extent to which the participants and the researchers can conduct a joint analysis, and the extent to which the granularity of the analysis should be distinguished for the purposes of supporting participants' PLD and developing the researchers' contributions to the field of research. However, the collaboration with researchers and the procedural steps such an analysis implies may provide the necessary distance for the participants to consider the recorded situations anew, and the relevance of the analysis can be secured on a continuous basis.

Whereas the chapter by Filliettaz et al. (2022, Chap. 19) refers to micro-sociology and ethnography of communication, the chapter by Lemmetty et al. (2022, Chap. 18) discusses a broader ethnographic approach in which the analytical interest is expanded to account for wider sets of activities and processes in the workplace. The authors build on organisational ethnography as a research approach and discuss how its principles and methods can be employed to study PLD as a culturally embedded and practice-based phenomenon. The overall aim is to gain a comprehensive understanding of PLD, as it is contextually framed and situated. Recognising that PLD manifests in different organisational layers and contexts, and that individuals' learning and development is still a key interest, the authors also discuss more recent developments of the use of ethnographic approaches in virtual environments as well as the emergence of what is called 'subjective evidence-based ethnography' (SEBE). Although the latter is an interesting take on examining what situations and social positioning literally look like from the perspective of participants by placing cameras at the eye level of participants' heads, it may break with some of the long-established principles of ethnography regarding including the wider practice settings and organisational environments where these recorded situations are embedded. A critical question is what counts as context when PLD is seen as contextually framed, and the context is a means to establish analytical accounts between individual actions, communities, and organisations. Nevertheless, the SEBE approach may be well suited to examine work practices on the move, as an alternative strategy to the previously mentioned shadowing technique, and it may provide close views of working tasks that are not easily observed through participant observation, such as screen-mediated work on computers or hand-held devices.

27.2.3 Fostering and Responding to Change in Education and Work Environments

Some chapters discuss approaches for interventionist studies in which researchers and professional practitioners collaborate to generate new insights and change the status quo of professional practices. In addition to the above-described chapter by Filliettaz et al. (2022, Chap. 19), this concerns the chapters on design-based research (DBR; Gerholz & Wagner, 2022, Chap. 23) and the change laboratory

(CL) approach (Kajamaa & Hyrkkö, 2022, Chap. 24). Both approaches are participatory in their character and aim to foster change in the environment where they are employed. Both have a long history in the learning sciences and within studies of work and organisational learning; however, they have possibly not yet been widely adopted in the community of PLD researchers addressed in this edited volume. DBR focuses on the design of learning environments to support specific learning processes or overcome challenges experienced in learning. Following Gerholz and Wagner (2022, Chap. 23), the approach aims to bridge the gap between rigour and relevance in educational research by developing practical designs while studying the processes and implications of the design to generate theoretical insights. The research process is iterative, moving between design, implementation, evaluation, and redesign as recurrent processes. Gerholz and Wagner (2022, Chap. 23) present a study that takes digitalisation and new competence needs in the field of VET as a point of departure, and the design object is lesson designs with tablets as tools to be incorporated in vocational education. Both students and teachers in the educational setting become participants. However, as the authors comment, the teachers' professional development was dependent on support from researchers in the project over a longer period of time. Kajamaa and Hyrkkö (2022, Chap. 24) present and discuss the CL approach as a means to facilitate teachers' collective transformative agency. This approach is grounded in cultural-historical activity theory and the theory of expansive learning, and the intervention takes place through a series of laboratory sessions in which researchers support practitioners in articulating challenges and revealing contradictions in their current work environments as a means to redesign their work practices by way of creating new ideas and tools. The CL approach is cyclic in character; however, in this case, the overall aim is to foster organisational change and expansive learning by developing the participants' transformative agency. Both the DBR and CL approaches are well suited to support collective professional learning and development in work communities through interventionist methods in which the researchers take the role of facilitators for change. These approaches might gain an increased foothold at a time when researchers are expected to engage more profoundly with users and stakeholders. A potential challenge with these approaches is generating theoretical and empirical contributions beyond the case, especially in projects where the main envisioned product of the research is located in the practices and understandings of the participants.

In addition to interventionist approaches, the edited volume comprises chapters that take other problems of change as their points of departure. Harteis (2022, Chap. 16) presents and discusses the use of the Delphi technique to investigate future visions and scenarios in a given area of work as well as how these visions might matter for professionals' orientations and development. Designated experts were invited to provide their prospective accounts in a written manner, which in turn were narrowed down, analysed, and validated through the use of different methods, including qualitative approaches. The Delphi technique is increasingly used in educational research and has its strengths in its potential to engage with emerging ideas and scenarios that have not yet materialised. Critical questions concerning this

approach include what kind of qualitative analysis can be used for what purposes and related to this is the role taken by the interpreter. An important principle in many approaches to qualitative analysis is to distinguish between the participants' own terminology and categorisation of their experiences or accounts, and the (often theory-based) language of the researcher. Even in explorative studies that aim at generating visions of novel phenomena, the analysts will have to work through language; therefore, it seems important to clarify their theoretical assumptions. Another question might be the extent to which it is important to reach agreement and consensus between the participants' accounts, or whether identifying variation could be considered asset in explorative and future-oriented studies.

Lastly, some chapters aim to address more comprehensive problems related to PLD by taking advantage of larger datasets and (automatically generated) data flows. Kyndt and Aerts (2022, Chap. 15) explore the possibilities for bringing big datasets into human interpretation by way of visual analysis as a way to better grasp the complexity of professional learning as a "wicked problem". Littlejohn et al. (2022, Chap. 25) discuss new methodological opportunities for learning analytics, which are still in their early phase of development and have hitherto been employed in formal educational settings rather than in work settings. Although they differ in their methodological challenges and approaches, both chapters show how the unpredictability and complexity of professional learning at work generate challenges for the research procedures—in terms of generating data for learning analytics (Littlejohn et al.) and keeping the 'wickedness' of problems while adhering to established principles for reliable research (Kyndt and Aerts). For instance, although Kyndt and Aerts depart from a system-theoretical understanding of professional learning as wicked problems, one may ask whether the suggested methodological attention towards hypothesis testing and emphasis on replicability would imply that the problems are again 'tamed' by the researchers. Where the use of learning analytics is concerned, an interesting avenue for further research might be to explore whether and how PLD researchers can make use of 'work analytics'—that is, data generated through the use of work support systems and digital platforms for work coordination—in their analysis of professional learning as intrinsic to work.

27.2.4 Summary

These chapters have discussed a wide range of methodological approaches and opportunities for researching PLD. One insight generated from the various chapters discussed above is that researchers interested in PLD need to carefully consider their unit of analysis, and how the phenomenon under investigation is framed in space and time. This may be even more important in qualitative research, as researchers often aim to examine social processes or relations in their relevant contexts. Reducing the social phenomenon is unavoidable to make it researchable, and the complexity of relations and processes involved in PLD can obviously never be grasped in one study (Ludvigsen & Nerland, 2018; see also the Special Issue of *Learning, Culture*

and Social Interaction, 2021, Vol. 31, Part B, devoted to 'The unit of analysis in learning research'). Some researchers delimit their research focus to a restricted timeframe and attempt to include a broader set of factors or relations in their analysis, for instance, by analysing the different dimensions that constitute a learning experience in a given situation. Others pursue processes over a longer time span but specify the analytical focus on particular aspects of professional learning, such as self-regulation. Yet others take a specific data type or opportunity for data generation as a starting point and examine their methodological opportunities. A range of complementary approaches is needed for the research field to provide comprehensive insights into PLD and the social and organisational arrangements that can support it. For individual studies, however, defining the unit of analysis and securing its theoretical framing from a related perspective on PLD is significant to clarify how and the limitations within which the study contributes to the wider research agenda.

As pointed out in quite a few chapters, professional learning at work is closely related to the enactment of work practices. This means that we need to understand the practices of work and how these are organised to understand professional learning as intrinsic to work. Given the overall theme of the volume, most chapters in this book start out from methodological problems and experienced challenges, rather than from the work itself. I will therefore in the next section reflect on how professional work environments are growing in complexity, and what we then need to account for in research on work-based PLD.

27.3 The Complexity of Work Environments: Emerging Challenges to Researching PLD

Professional work organisations and practices are undergoing profound changes that matter for how learning demands and opportunities manifest. Several chapters in this volume argued for a need to study PLD processes in the work situations where they occur, and account for the contextual features that shape learning processes and experiences (see Sect. 27.2 above). When work processes are physically distributed and expanded in time, new interdependencies emerge between participants in various practice settings. Together with the presence of advanced tools and infrastructures, it becomes more challenging to analytically define work contexts and decide on which elements to include in the unit of analysis. In this section, I will return to the second methodological change driver mentioned in the introduction to this chapter and discuss how changes in the organisation of professional work itself bring forth new questions and elements of practice that need attention in research on PLD.

In particular, more intensified digitalisation processes play a key role in transforming work and bringing new interdependencies and demands to expertise to the fore. The impact of digitalisation processes on organisational life is widely theorised and researched in the field of organisation studies and sociology of work

organisations (e.g., Anthony, 2021; Bailey et al., 2022; Pachidi et al., 2020), and increasingly so by scholars in professional and workplace learning (e.g., Harteis, 2022; Littlejohn & Pammer-Schindler, 2022). This literature highlights, first, how new and more advanced technologies are at play in professional work practices, for instance, how artificial intelligence and algorithm-based support are incorporated in tools and information systems that alter the conditions for decision-making (Anthony, 2021). This poses challenges to experienced professionals, who need to learn how to trust and interrogate automatically generated suggestions. It also challenges the way newcomers can learn and develop expertise, as important aspects of expert practice may remain black-boxed and difficult to observe for novices. How work can be organised to better support these learning processes is therefore an important question.

Second, researchers have examined how new working tasks come to the fore and have expanded the scope of the responsibilities professionals face at work. Some of these responsibilities are related to future-oriented efforts in which professionals actively engage in reconstructing work practices to accommodate wider processes of digital transformation. Other responsibilities concern the need to understand the wider set of organisational processes and interdependencies in which their work is located. One example is provided by Herzum and Simonsen (2019), who examined work in a hospital setting and identified a set of competencies that are needed in the local work environment to configure an information system for productive use. They argue that 'understanding practice' emerges as a larger competence issue than 'understanding the technology' and that professionals increasingly need to understand what others are doing in the chain of actions that make up the services.

Related to the latter issue, the transformation of professional work is also driven by a growing complexity in the diversity of actors and concerns. Grounded in the sociology of professions, Noordregraaf (2016, 2020) discusses how professionals need to relate actively to stakeholders and actors outside their professional realm to ensure that their expertise is sustained and entrusted. This implies that professionals take on responsibilities for the way work is organised to accommodate various concerns and for sorting relations and connecting with stakeholders in productive ways. In the literature on professional learning, some researchers have started to examine what it entails to engage with a wider set of actor constellations in the ongoing realisation of knowledge work (e.g., Tronsmo, 2020). A recognised yet growing research interest is the way professionals learn to collaborate across domains of expertise. Markauskaite and Goodyear (2016) argue that professionals today often work on tasks that depend on other professions and "operate in circumstances where their own professional knowledge is insufficient for success and their own professional practices have to adapt to the practices of others" (p. 25). They suggested the concept of epistemic fluency to analyse how professionals can learn to integrate different forms of knowing and adapt this to different work contexts. Moreover, to better understand how theoretical knowledge can become productive in complex practical situations, they suggest focusing on the construction of actionable conceptualisations as a unit of analysis and employing a multimodal blending perspective as an analytical approach (Markauskaite et al., 2021). This research

strategy would require in-depth studies of constructive activities in situ, and approaches to data collection and analysis that account for different types of object construction as well as representations of knowledge and forms of knowing. Another contribution to researching work and learning in interprofessional collaboration is provided by Edwards (2010), who develops a perspective on relational expertise and employs analytical resources from cultural-historical activity theory to examine the practices through which professionals build relational agency and work together to overcome knowledge boundaries. Here, the established and envisioned practices of the professionals and how these are negotiated in the organisational context are foregrounded.

Together, these strands of literature underscore how the work environments of professionals are increasing in complexity in ways that call for continuous learning and development. Learning to take part as skilful practitioners is not restricted to learning how established work procedures and ways of knowing can be accomplished. Rather, professional work implies taking part in knowledge-generating activities and in service redesign, in which digital tools and infrastructures play prominent roles (Nerland & Hasu, 2021). Increased attention has, therefore, been given to how professional education can prepare students for these activities (Damşa & Nerland, 2016; Markauskaite & Goodyear, 2016). Moreover, through the way technologies and practices become linked in wider infrastructures, work processes become distributed over a wider scale and are constituted through multiple interdependencies between actors and sites (Nicolini et al., 2018). These and other transformations of work enlarge the scope of relations and actors that need to be accounted for in research on PLD. On the one hand, there is a need to expand the unit of analysis to include how the learning-through-practice that emerges in one setting is interlinked with practices and relations elsewhere in the organisation. On the other hand, researchers may need to go 'deeper' into the actual work practice and examine how its implicit epistemological underpinnings—for instance, an algorithm-based support mechanism or the view of a non-present stakeholder—inform ways of knowing in the given situation. Further, the temporal scope of the research is an issue. As more work processes are oriented towards changing and developing the ways of working, and professionals move in-between various sites, roles, and responsibilities, research designs that follow workers and work processes over a longer time span would also be of great interest from a PLD perspective.

In these efforts, a variegated set of research projects and practices that draw on different theoretical and methodological approaches are needed. In particular, a way forward could be to establish more strategic connections to other research fields that take an interest in work-related learning and development. In fields such as organisation studies, information system research, and infrastructure studies, there is a growing interest in learning and competence development as essential for work performance. Here, researchers from the PLD community would bring important insights and analytical approaches to the table. Further, the analyses of PLD could draw on expertise from these domains to better account for organising processes and the complexity of the IT systems with which professionals interact. In such collaborative efforts, it is important to expand the scope of the analysis without losing the

PLD researchers' identity as affiliated with their research field. Hence, as the complexity of work organisations moves into the analytical foci, a joint responsibility should be to keep the phenomenon of PLD discernible and secure so that the research contributions add to our knowledge about human learning and development in shifting professional, social, and institutional contexts.

27.4   Conclusion

In qualitative research on PLD, a recurrent challenge is to find adequate ways to approach and delimit work practices within which learning unfolds, especially when work becomes multi-sited, interlinked in network constellations of actors and practices, and possibly black-boxed through the use of various information systems. Efforts to combine data sources, account for interdependencies, and make implicit aspects of work practices accessible for analysis are examples that push qualitative approaches in professional learning research to include more relational and organisational dimensions. Further, other changes in the work organisation can stimulate a renewed interest in the experiences and ambitions of the learning subject. For instance, the increase in portfolio careers and the emergence of platform-mediated and self-employed work may call for approaches to better grasp learners' agency and strategies for working within dynamic and changing organisational environments.

The current book is a valuable contribution to methodological discussion and awareness, which, through its various chapters, provides condensed introductions to various approaches as well as examples of how the given method or approach has been used in studies of professional learning or development. Moreover, the volume is useful for research students in their efforts to explore and consider the opportunities that different methodological approaches provide. Today's publication regimes emphasise journal contributions, in which the limited length of the manuscripts may imply that the methodological choices and steps taken in the analysis are less transparent, leaving these important parts of the research handicraft implicit for the reader. Hence, a book like this is very valuable as the chapters present, discuss, and illustrate the use of different approaches.

With some exceptions, the methods and approaches presented in the chapters discussed here are not new in themselves. Rather, most of the qualitatively oriented chapters discuss well-established approaches to data collection and analysis in the social sciences. However, as several chapters show, these approaches are adapted to grasp emerging aspects of PLD in new and changing organisational environments. For instance, both diaries and stimulated recall interviews have a long history as data sources but their potential for generating significant insights is revitalised in organisational environments where work processes are black-boxed through technology use and important aspects of problem-solving are not observable for the researcher. The integration of work and learning in such environments thus needs to be articulated to be analysed. How professionals experience and explain these

processes may be more significant in generating novel insights into PLD than the established categories and measures predefined by researchers. Nevertheless, explorative research and theorising need to go together for cumulative research insights to emerge.

In the further development of the PLD research field, a variety of methodological approaches are needed to examine the different processes and relations that such learning implies. There is a need to account for the personal dimensions of PLD, but also for collective dimensions and their relations to materiality, organisational contexts, and discourses. To take advantage of the variegated opportunities that qualitative approaches can offer, studies that take different units of analysis are needed. I envision that the different qualitative methods and approaches presented in this volume will contribute to future research as well. We will probably both see a renewed interest in phenomenological and experience-based approaches, and a growing attention to the way work and learning are accomplished and integrated in unfolding practices. We will see more studies oriented to micro-phenomena in specific professional actions, and more studies that span organisational settings and processes. I also envision a stronger presence of interventionist studies, as the processes and political frameworks regulating research, learning, and innovation become intertwined. Hopefully, we will also see more collaborative efforts between professional learning researchers and scholars in other fields targeting work organisations and practices. The complexity of PLD research as a field will then reflect and adapt to the complexity of the phenomenon of professional learning and development in a dynamic manner.

References

Anthony, C. (2021). When knowledge work and analytical technologies collide: The practices and consequences of black boxing algorithmic technologies. *Administrative Science Quarterly, 66*(4), 1173–1212. https://doi.org/10.1177/00018392211016755

Bailey, D., Faraj, S., Hinds, P., Leonardi, P. M., & von Krogh, G. (2022). We are all theorists of technology now: A relational perspective on emerging technology and organizing. *Organization Science, 33*(1), 1–18. https://doi.org/10.1287/orsc.2021.1562

Cuyvers, K., Van den Bossche, P., & Donche, V. (2022). Longitudinal case study research to study self-regulation of professional learning: Combining observations and stimulated recall interviews throughout everyday work. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 579–600). Springer.

Damşa, C. I., & Nerland, M. (2016). Student learning through participation in inquiry activities: Two case studies in teacher and computer engineering education. *Vocations and Learning, 9*, 275–294. https://doi.org/10.1007/s12186-016-9152-9

David, L., Endedijk, M., & Van den Bossche, P. (2022). Investigating interaction dynamics: A temporal approach to team learning. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 187–209). Springer.

Denzin, N. K., & Lincoln, Y. S. (2018). Introduction. The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (5th ed., pp. 1–26). Sage.

Edwards, A. (2010). *Being an expert professional practitioner: The relational turn in expertise*. Springer.

Filliettaz, L., Garcia, S., & Zogmal, M. (2022). Video-based interaction analysis: A research and training method to understand workplace learning and professional development. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 419–440). Springer.

Gerholz, K.-H., & Wagner, A. (2022). Design-based research – Grounding, understanding and empirical illustration in the context of vocational education. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 513–534). Springer.

Harteis, C. (2022). Research on workplace learning in times of digitalisation. In C. Harteis, D. Gijbels, & E. Kyndt (Eds.), *Research approaches on workplace learning* (Vol. 31). Professional and Practice-based Learning, Springer. https://doi.org/10.1007/978-3-030-89582-2_19

Harteis, C. (2022). Delphi-technique as a method for research on professional learning. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 351–371). Springer.

Herzum, M., & Simonsen, J. (2019). Configuring information systems and work practices for each other: What competences are needed locally? *International Journal of Human-Computer Studies, 122*, 242–255.

Kajamaa, A., & Hyrkkö, S. (2022). Change laboratory method for facilitating transformative agency and collective professional learning – Case from a Finnish elementary school. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 535–556). Springer.

Kyndt, E., & Aerts, J. (2022). Addressing 'wicked problems' using visual analysis. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 329–348). Springer.

Lemmetty, S., Collin, K., Glăveanu, V., & Paloniemi, S. (2022). Capturing actions of communities: Towards virtual ethnography and digital tools in researching organizations and workplace learning. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 397–418). Springer.

Littlejohn, A., & Pammer-Schindler, V. (2022). Technologies for professional learning. In C. Harteis, D. Gijbels, & E. Kyndt (Eds.), *Research approaches on workplace learning. Professional and practice-based learning* (Vol. 31). Springer. https://doi.org/10.1007/978-3-030-89582-2_15

Littlejohn, A., Kennedy, E., & Laurillard, D. (2022). Professional learning analytics: Understanding complex learning processes through measurement, collection, analysis, and reporting of MOOC data. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 557–578). Springer.

Ludvigsen, S., & Nerland, M. (2018). Learning at work: Social practices and units of analysis. In F. Fischer, C. E. Hmelo-Silver, S. R. Goldman, & P. Reimann (Eds.), *International handbook of the learning sciences* (pp. 147–156). Routledge.

Markauskaite, L., & Goodyear, P. (2016). *Epistemic fluency and professional education*. Springer.

Markauskaite, L., Goodyear, P., & Sutherland, L. (2021). Learning for knowledgeable action: The construction of actionable conceptualisations as a unit of analysis in researching professional learning. *Learning, Culture and Social Interaction, 31*, Part B. https://doi.org/10.1016/j.lcsi.2020.100382

Maxwell, J. A., & Chmiel, M. (2014). Notes toward a theory of qualitative data analysis. In U. Flick (Ed.), *The SAGE handbook of qualitative data analysis*. Sage.

Nerland, M., & Hasu, M. (2021). Challenging the belief in simple solutions: The need for epistemic practices in professional work. *Medical Education, 55*(1), 65–71. https://doi.org/10.1111/medu.14294

Nicolini, D., Mørk, B. E., Masovic, J., & Hanseth, O. (2018). The changing nature of expertise: Insights from TAVI. *Studies in Continuing Education, 40*(3), 306–322. https://doi.org/10.1080/0158037X.2018.1463212

Noordegraaf, M. (2016). Reconfiguring professional work: Changing forms of professionalism in public services. *Administration and Society, 48*(7), 783–810. https://doi.org/10.1177/0095399713509242

Noordegraaf, M. (2020). Protective or connective professionalism? How connected professionals can (still) act as autonomous and authoritative experts. *Journal of Professions and Organization, 7*(2), 205–223. https://doi.org/10.1093/jpo/joaa011

Pachidi, S., Berends, H., Faraj, S., & Huysman, M. (2020). Make way for the algorithms: Symbolic actions and change in a regime of knowing. *Organization Science, 32*(1), 18–41.

Paloniemi, S., Penttonen, M., Eteläpelto, A., Hökkä, P., & Vähäsantanen, K. (2022). Integrating self-reports and electrodermal activity (EDA) measurement in studying emotions in professional learning. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 87–109). Springer.

Rausch, A., Goller, M., & Steffen, B. (2022). Uncovering informal workplace learning by using diaries. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 43–70). Springer.

Silvennoinen, M., Parviainen, T., Malinen, A., Karjalainen, S., Manu, M., & Vesisenaho, M. (2022). Combining physiological and experiential measures to study adult learning. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 137–164). Springer.

Tronsmo, E. (2020). Changing conditions for teachers' knowledge work: New actor constellations and responsibilities. *The Curriculum Journal, 31*, 775–791. https://doi.org/10.1002/curj.60

Vähäsantanen, K., & Arvaja, M. (2022). The narrative approach to research professional identity: Relational, temporal, and dialogical perspectives. In M. Goller, E. Kyndt, S. Paloniemi, & C. Damşa (Eds.), *Methods for researching professional learning and development: Challenges, applications, and empirical illustrations* (pp. 373–395). Springer.

Monika Nerland (PhD) is Professor in the Department of Education, University of Oslo. Her research focuses on professional learning in education and work contexts. Particular interests are how the knowledge practices of professional communities provide distinct opportunities for learning and identity formation, and how professional expertise is affected by technological and societal change. She has led several research projects that investigated these themes comparatively across professions. She is currently leading the research project CORPUS, which investigates implications of digitalisation for work and learning in the primary health sector in Norway.