

Chapter 7

Enhancing Learning in the Workplace



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Abstract In rapidly changing circumstances the organisation of work takes on important convergences. These include an intensification of work processes; and increased expectations driven high market and community expectations of reliability of supply, and high levels of reliance on modern and emerging technologies – especially information and communication technologies. In these changing work contexts learning in the workplace becomes increasingly important. In these workplaces learning is critically important. In the chapter learning is framed as inherent to the nature of work in these contexts.

Individuals learn formally and informally; they learn variously through watching others and they learn with others. At an organisational level learning is also important when the experiences of workers are captured so that these organisations may adapt in order to be agile and resilient to unknown futures. In this respect, learning is a two-way process. The focus is not just on how workers learn either formally or informally, but on how organisations learn from the experiences of their workforce in order to adapt in an increasingly competitive economic environment.

In the chapter learning is theorised both from a psychological standpoint and a socio-cultural perspective. This is because both contribute to our understanding of the formal and informal processes involved. Drawing from an adaption of experiential learning the chapter analyses the ways in which elements of work organisation can both enable and constrain the processes important in learning: reflecting on, making sense-of and envisaging new futures that may be experienced in the workplace. By using research conducted in the air traffic control workplace the chapter highlights the ways in which work organisation shapes the experiences of work and the ways in which reflection is mediated by narratives and stereotypes that become part of a cultural collective memory. Conceptualising, is the process of making sense of what has occurred, to interpret reflections on experience and to generalise these interpretations to new settings. However, what will be noticed and attended to will also be shaped by organisational cultures which are based on collectively held

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beliefs and values (where schemas or shared mental models of sense-making are embedded). These in turn generate norms of practice. A final element essential in the learning process is experimentation. Envisaging new alternatives may occur also in thinking about past actions (reframing). In this case an expansion of the range of choices available might be made though they may or may not be acted upon in the future. Opportunities for experimentation are mediated by the structuring of work experience as well as workplace cultures. In high intensity, high reliability and high technology workplaces learning from near misses and mistakes can be framed as a form of experimentation. In drawing on these events as a resource it is possible to reframe them as valuable opportunities for learning.

In rapidly changing circumstances learning is increasingly part of the currency of production and of safety. In the future organisations that are most productive will be those who understand the value of learning from events that happen in the workplace. This will be particularly so as work continues to increase in intensity in terms of demands and multi-tasking and when there is a need to be more efficient and agile.

Keywords Workplace learning · Experiential learning · High intensity · High reliability and high technology workplaces

The dynamism of work processes, workplace organisations and markets demands of us a wider focus on the full range of workplace learning contexts. To consider how facilitators and designers of workplace learning spaces may support learners for unknown futures I would like to propose that we perhaps need to be enhancing our peripheral vision – a kind of conceptual and practical cataract surgery – such that we can scrutinise and attend to *all* modes of workplace learning.

Given the expansive view of learning adopted in this chapter workplace *learning* is defined as the process of transforming experience through reflection, sense-making and experimentation which leads to an increased capacity to act differently in the environment (after Kolb, 2014). It is distinguished from individual training and competencies that are part of skills packages.

This chapter argues that we need to be sensitive to the range of structural and cultural factors that enhance and inhibit learning in workplace contexts. Workplace learning can be formally accredited and instructor-centred; it can also be informal and incidental. Finally it can occur at individual team and even organisational levels. Individuals learn formally and informally; they learn variously through watching others and they learn with others. At an organisational level learning is also important when the experiences of workers are captured so that these organisations may adapt in order to be agile and resilient to unknown futures. In this respect, learning is a two-way process. The focus is not just on how workers learn either formally or informally, but on how organisations learn from the experiences of their workforce in order to adapt in an increasingly competitive economic environment.

The Future of Work and Implications for Learning

It is proposed that there is an important convergence occurring across workplace organisations, such that workplaces in the future will take on the features more and more of what I have labelled “High-3” characteristics: high intensity of work processes, high market and community expectations of reliability of supply, and high levels of reliance on modern and emerging technologies –especially information and communication technologies (Owen, 2017).

“High-3” (high-intensity, high-reliability and high-technology) workplaces rely on technologically-mediated work which can be complex and involve higher-order thinking (i.e., where the path of action often yields multiple solutions and requires nuanced judgement); intense because of time imperatives coupled, often, with significant complexity; and high-reliability because an error can potentially lead to unacceptable consequences not merely for lifestyles but for life-chances (Owen, 2014a, b, 2015).

High-3 organisations are observable in virtually all industry sectors, although the more-developed examples are to be found within transportation (e.g., air and sea), the military, police, emergency services (e.g., ambulance and firefighting), health services (e.g., operating rooms), manufacturing (e.g., chemical industries); critical infrastructure (e.g., water, energy, telecommunications) and key elements of the finance sector (e.g., banking, stock exchanges). Moreover, the proportion of organisations characterised by these forms of work is growing and will become more important in the future, as part of the growth of a knowledge-based economy, as is our reliance on them (e.g., Hoc & Carlier, 2002; Hollnagel & Woods, 2005; Soraji et al., 2012).

It is contended that our interest in these high-3 workplaces should not stem only from their *current* importance in our economies, and our lives. Rather, we should recognise the range of social and economic factors that are inexorably requiring that *all* workplaces move to exhibit high-3 features. Competition between firms – indeed between nations – revolves around gains in productivity, the efficiency with which we transform inputs into marketable outputs. In all industry sectors (and no less in public service sectors), we are witnessing pressure to lower unit costs, to respond quickly and reliably to consumer demands, and to interact with consumers via contemporary and emerging technologies (Barton & Sutcliffe, 2009; Bound & Rushbrook, 2015; Grote et al., 2008). Whether we are comfortable with this or not, the future is likely to see businesses succeed or fail based on their capacity to embrace intensity, reliability and technological mediation.

Organisations deliver highly reliable performances when members have the ability to prevent and manage challenges before they spread throughout the socio-technical work system causing widespread damage or failure (Barton & Sutcliffe, 2009, p. 1329). This occurs when team members engage in social mechanisms for monitoring and reporting small or weak signals to one another (e.g., that something might be wrong) and members have the capacity to adjust to these changing conditions. This requires empowered communication climates where robust

discussion employing diverse perspectives can be encountered. Thus members of future focussed work environments will have both the flexibility required and the capability to respond in real-time, reorganising resources and actions as necessary. In this regard high-reliability organising and safety is achieved through human processes and relationships. Members share what they know, raise concerns about weak signals of possible failure, and the team adjusts, tweaks, and adapts to these small cues or mishaps. If these signals are left unaddressed they could result in larger problems and potential failures in safety (Owen, 2017).

The implications for learning in the workplace are that the very skills we might think of as learning (e.g., asking questions, sharing observations; giving and seeking feedback; making sense of new information; seeking alternative perspectives, seeking clarification, and consulting and collaborating) will be increasingly needed in a range of work roles, blurring the line between formal and informal workplace learning.

Finally, workplace learning is also important in another respect. For organisations to adapt and thrive in a fast-paced globalised and competitive world, learning has to become integral to the work itself. This means that organisations need structures and cultures that can capture and learn from the experiences of workers and teams to enable *continuous inquiry for organisational learning*.

This is especially so in High-3 environments where disturbances may be regarded as “opportunities for use and expansion of individual competencies and for organisational innovation and change” (Grote et al., 2008, p. 19). However, this also needs to be balanced with the latitude given to local actors to exercise their own agency (see Chap. 2) to handle uncertainties in a flexible manner – latitude that is necessarily constrained by the need for standardization and centralization to prevent system failure. Bound and Rushbrook (2015) draw attention to the criticality of workplace relationships, and to the intertwined human and social processes of learning and working. In addition, any analysis needs to account for the active nature of workers in shaping their workplace contexts – as well as being shaped by them. This is an important theme in this book: the ways in which context is integral to learning and the agentic nature of workers in shaping their learning (see also Bound et al. Chap. 2, this volume).

Theorising Workplace Learning

The need to widen our attention from teaching to learning requires an enhanced emphasis on the ways that individuals (and teams and organisations) actually learn. This obliges us to acknowledge the contribution of conventional (psychological) theories of learning and move beyond them to incorporate socio-cultural insights. Conventional theories of learning focus on the processes involved in individual skill acquisition resulting in durable changes in cognition and behaviour. This is still important in our understanding of the development of expertise (e.g., Chi et al., 2008). Socio-cultural theories of learning suggest that learning, particularly in a

workplace, cannot be separated from its context (Lave & Wenger, 2002, 2005; Bound et al., Chap. 2, this volume). Learning and development do not occur solely inside an individual mind as psychological theories would suggest but rather emerge as one proceeds through a task in collaboration with others and involves the use of artefacts (i.e., tools as resources such as technologies or procedures). Learning also occurs socially through watching others (e.g., vicarious learning –Bandura, 2001). In this respect learning is intertwined with the technical performance of work, its social networks being seen as a shared social practice (Gherardi, 2009; Collin, 2006, 2008).

From this perspective, then, the difference between psychological cognitive approaches to learning and socio-cultural approaches is that the focus of attention switches from the individual to the group or community of practice. In this way, Konkola et al. (2007, pp. 213–214) argue that expertise is not just developed inside the practitioner’s head but also “expands the structures of knowledge to include not just mental and symbolic representations but also . . . recurring patterns of social practice.” From this point of view, what is regarded as “good” practice is not just determined by some external normative set of regulations but what, informally, the work group regards as important (or not), as culturally valued (or not). This raises a key question for practitioners of learning: to better understand what the learning group values (or not); feels is important (or not); and what members of the group believe is important to learn (or not). Unpacking these frames and how they shape worker identities will be important if we are to move toward a future orientation in being and becoming as contended by Bound, et al., (Chap. 2, this volume).

Learning embedded within work practice is important in all workplaces. It is especially important where work practices are fast-paced, require higher-order thinking and where the reliability of operations is critical. In these environments, learning-related communication as part of the ongoing process of work is vital to enable the constant adjustments needed in managing dynamic events.

A Framework for Learning in the Workplace

To elaborate on processes important for workplace learning, a framework of learning will now be outlined where their implications for workplace and designers of work/learning spaces can be discussed. The framework chosen for exploring these questions is drawn from an experiential learning theory originally developed by David Kolb (1984). This framework has been selected because it grounds learning in actual experiences rather than classrooms or training environments and because it is well established in both education and organisational learning. Kolb proposed that for learning to occur a learner moves through four processes: experience, reflection, conceptualisation (sense-making), acting or experimenting in new ways. For the purposes of this analysis the following definitions, adapted from the four elements identified as integral to learning by Kolb are offered:

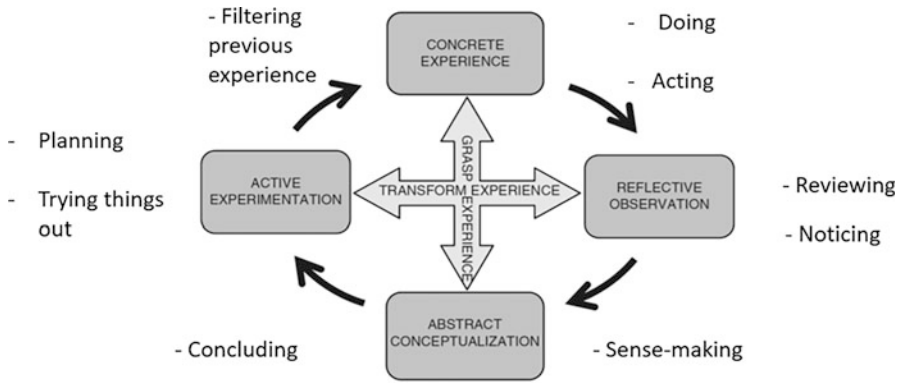
- Experience occurs as part of being-in the world and may be registered through what we see, think, hear and feel as we interact with our environment. It may occur directly or may be experienced indirectly through others (e.g., vicarious experience).
- Reflection is the process involved when attending to, noticing, recalling elements that are significant in the experience and can be either passive or active.
- Conceptualisation is the process of thinking about, making sense of, interpreting and comprehending those reflections and experiences.
- Experimentation is the activity associated with developing choices and envisioning new ways of acting that may have occurred in the past, be occurring in the present or likely to occur in the future.

Kolb's work draws on early theorists of cognition and human development to content that learning occurs as a result of a resolution of a contradiction or conflict between opposing ways of dealing with the world: between reflection and action on the one hand and between doing and thinking on the other. Underlying these processes of learning about the world is the notion that both apprehending (grasping understanding) and comprehending (understanding and moving on) are important. There is a similarity here with the micro-interactions and discourses discussed in Chap. 2.

The very nature of a dialectical process means that engagement may move back and forth between processes such as reflection and experience (or any other parts of the experiential cycle) before progress in learning is achieved. Although Kolb (1984) discussed the dialectical movement between the various processes involved in learning, his work has been popularised as a set of four "stages" involved in the learning cycle, and these are frequently presented as if they are discrete entities that occur in a rigid, unidirectional cycle.. Learning can be triggered at any one of the processes. Some people may, for example, start by creatively experimenting with something to see what happens. Others may need to have a bigger theoretical picture – to understanding the theoretical principles or philosophy before proceeding to experience. What is important however is that while one part of the cycle may be the starting point or be greater in emphasis, all four are necessary if learning is to occur. Thus these four elements of the learning cycle identified by Kolb can be fused within a particular work activity.

For the purposes of this chapter, however, they are discussed separately so that their insights about what needs attention in workplace learning can be discussed. Before proceeding it is useful to examine the strengths and limitations of this approach.

An important strength is that Kolb does not make the mistake of equating learning with the acquisition of knowledge. For Kolb, learning must be evident in what people do. Second, in organisations, problems are both the stimulus and the medium for learning. In this respect, Kolb's model is directly applicable to conceptualising how people in organisations may experience problems and learn from them. Third, his model draws on explicit processes that are necessary for effective learning to occur and thus provides a useful framework for explicating phases of learning (Fig. 7.1).



The experiential learning cycle (Source: Kolb, 1984)

Fig. 7.1 Expanding experiential learning. (After Kolb, 1984)

Kolb’s framework needs to be adapted to illustrate the influence of contexts on learning in the workplace. From a sociocultural perspective, the social environment – the work group and other communities of practice – also influences learning. Learning is mediated by elements found within the immediate situation. The tools and physical resources people have available to them would also structure their learning, as would histories of previous experiences of people and their structural roles within activity systems (Engestrom, 2004). Table 7.1 outlines the key aspects discussed in this chapter.

The Role of Experience in Learning in the Workplace

According to Boud and Walker (1993) “experience is created in the transaction between the learner and the milieu in which he or she operates – it is relational” (p. 11). Experiencing is always grounded in a socio-cultural context and is, therefore, influenced by artefacts. In the workplace context, for example, experiences are structured by the artefacts used in work organisation, such as the physical resources, policies governing activity which structure workplace experience, and opportunities for experience. However, experience also involves perception, implies consciousness and always comes with meaning (Boud et al., 2006). Given that interpretation of meaning is the foundation for culture, culture is thus always embedded in the interpretation of experience. The structuring and interpreting of experience will influence opportunities for learning in certain ways because structures will make certain opportunities available and not others and cultures will focus attention on particular interpretations of the experience and not others.

Table 7.1 Process of learning

Process of learning	Elements of workplace contexts
Experiencing (involving physical; psychological and social aspects of work practice)	Physical design of organisation of work influences the kind of experiences people have;
	Use of technological artefacts make work visible or hidden
	Degree of differentiation of job tasks
	Workforce development policies shape experiences workers can have
Reflecting (observing, narrating, remembering, pattern seeking, labelling)	Tempo of work enables or constrains opportunities for reflection
	Structuring of job roles;
	Organisation of work into teams
Conceptualising (sense-making; reframing, pattern generating, accounting for; explaining)	Occupational and social identity formation; collective schemas (in-groups/out-groups)
	Shared beliefs and values (stereotypes)
	Collective remembering (e.g., war stories)
	Group norms of practice
Experimenting (envisaging, (re) evaluating; adapting, innovating)	Policies and rules shape the degree of latitude available in choices that can be applied
	Shared experience through teamwork

In my own research investigating how trainees in air traffic control experienced learning in their workplace I found that the way in which the work was organised emphasised four dimensions of experiencing (Owen, 2009b, 2008, 2017). Air traffic control work is experienced corporeally, complexly, affectively and socially. Since the work cannot be stopped and problems must be addressed in the moment, trainee controllers use their bodies to indicate when they might be getting overloaded (e.g., perspiring; standing up to work rather than remaining seated; getting red in the face). Second, the work is structured so that it is also experienced complexly. Complex work requires the coordination of multiple tasks that in turn require higher order thinking and in combination with the temporality of work. Practice is needed to build up awareness and understanding of the various permutations of problems and problem solutions that successful task completion may require. An affective dimension is also evident given that one’s performance is on show and is therefore an expression of self to the group. This is akin to the importance of the self and social identities as raised in Chap. 2, this volume by Bound et al. Finally, a social dimension is evident in the interdependence of job tasks where work building up on a neighbouring console is a signal of workload that can be anticipated.

These dimensions of experience are arguably characteristic of work generally, but are especially important in the future as work practices take on more of the features of High-3 work. Work may be intense on the body; easy or demanding on the mind; an expression of, or alienation of, the self and it always occurs in a social context, although some forms of work organisation provide more emphasis of the social than others. The key point here is that the way work is organised shapes opportunities for experience in certain ways and it is important for both facilitators of workplace

learning and designers of work and learning spaces to consider this element. In addition, examining the ways in which organisational structures and cultures influence the transformation of experience into learning by enabling or constraining reflection is worthy of focus.

The Importance of Reflection for Learning in the Workplace

In learning theory terms, reflection is an essential ingredient for learning (Boud et al., 2013; Brookfield, 2005; Schon, 1991). Reflection involves attending to the salient features of an experience, marking and noting those features through labelling and pattern seeking. It consists of those moments individuals engage in to recapture, observe and notice and to begin to make sense of their experience: “to work with their experience to turn it into learning” (Mason, 1993 p. 9). Individually, the degree to which reflection is engaged in will depend on the motivational levels of the person to make sense of the experience and their interpretation will be influenced by their sense of self-efficacy.

In the workplace, cultures are based on the salient features of experience which are noted, collectively remembered and attended to through narration and through the common language and symbols that work groups use to share and express their experiences with others (Augoustinos et al. 2014).

Reflection on experience also becomes part of collective memory– in the case of many High-3 work contexts like aviation and emergency services – through the narration of “war stories”. In these contexts, cultural processes of reflection can be found in stories workers share about their experiences (good and bad) where through the stories one learns how to operate if the same experience is confronted. War stories provide access to previous experiences of unanticipated disturbances. War stories are the stories of a worker’s experience when something dramatic happens, perhaps because of an individual’s performance (or lack thereof), system deficiency or an unexpected event. War stories are used to help illustrate both good and bad actions, right and wrong ways of operating, thus supporting informal learning. War Stories are important artefacts within the specific forms of collective reflection on “critical incidents” discussed later in this chapter.

In terms of organisational structure, capacities for reflection are variously designed into job roles. The form of work organisation characterised by Taylorism, for example, was predicated on the basis of removing opportunities for reflection (and conceptualisation) from certain job roles. In future-oriented work contexts where work is likely to be of a faster pace to the extent in some circumstances (e.g., aviation emergency services) where it cannot be stopped, reflection can be limited and so both facilitators of workplace learning and designers will need to look for other ways of embedding reflection into work practice. In my own work, I found that reflection also occurred in individuals watching others and when those individuals took on instructional roles where they were required to observe a trainee and provide feedback (Owen & Page, 2010).

Encouraging reflection as part of work activity has been a feature of many professional development programs (see for example, Schon, 1983, 1987). However, some work cultures (and their worker identities – see Chap. 2) may resist engagement in reflective practice because such activity is neither part of their history of experience nor part of their collective identity.

In terms of enhancing all forms of workplace learning, facilitators and designers need to ensure a variety of means of capturing experience so that it can be reflected upon later. These may include checklists about what elements of the experience need to be captured now so that they may be reflected upon later. Having appropriate time and space organised into work activity to reflect will also be important, as will be having a facilitator who can ask the critical questions. Capturing experience is not just important in accredited workplace learning but also for the organisation to learn from the experience of its workers. In my work in the emergency services domain, personnel need to find ways to detect weak signals that something may be going wrong (or has gone wrong) so that it can be examined at length later. One way of doing this is to revisit the experience after an event in a debrief process and walk back – sometimes literally as well as figuratively – through the moments that led to the challenges that were faced (Owen, 2014a).

There is a close link between individual and collective processes of both reflection and the next phase of the learning cycle, conceptualisation (or making sense of reflections on experience). Structures and cultural contexts also enable and constrain the next process in the learning cycle, conceptualisation.

The Role of Conceptualisation for Learning in the Workplace

Conceptualising, is the process of making sense of what has occurred, to interpret reflections on experience and to generalise these interpretations to new settings. Many learning theorists find it difficult to tease out reflecting from conceptualising, since the process of making meaning relies on the interconnection of noticing, interpreting and making sense (see Argyris, 2004; Augoustinos et al. 2014). While the processes of reflection and conceptualisation in learning have been separated it is acknowledged that in the everyday world these elements are closely intertwined. The conceptualising process begins with the elements of reflection (observing, noticing and labelling which triggers remembering).

Conceptualising is a practice whereby the meaning from the experience is generated into concepts or ideas that can apply to situations beyond an explanation of the immediate experience. As such, conceptualising has also been called theorising. Mason (1993) commented that the term *theorising* is based on the Greek root *theoria*, meaning *a way of seeing* and *abstracting*. One of the meanings of abstracting is the search for or distillation of essence or structure. Mason's comments demonstrate also the close linkage between the processes of conceptualisation and experimentation – the next element in the learning cycle, since noticing and interpreting leads to the development of alternatives that can be

used in the future. Conceptualising, or generalising from one experience to another, involves identifying patterns in experience found through reflecting and generating ideas about those patterns in other events. Organisation and categorisation of perceptions enables comprehension and interpretation of the social world. In theories of “reflective learning” or “reflection-in-action” (Argyris, 2004; Schon, 1983, 1987, 1991), the elements of reflection and conceptualisation are evident but not separate. For these theorists, the processes of reflecting and conceptualising together are called “reframing”. That is, an initial perception is transformed into a new understanding or frame. In Chap. 2, (this volume) Bound and colleagues outline a process of reframing that occurs through a dialogical process of self-reflection.

However, sometimes, conceptualising or reframing is constrained by what is observed or noticed, a feature that is important in social cognition and constructivism. For Resnick (1993), interpretation of experience is based on schemas that both enable and constrain individuals’ processes of sense-making. A schema provides an interpretive framework that allows reasoning to proceed (Resnick, 1993).

As an interpretive framework, provides the foundation and is embedded with a workplace identity. It is often based on past history, sets up expectations about what will be important, and therefore will help guide what we attend to, what is perceived, what will be remembered and what will be inferred. What this illustrates is that schemas are not purely individual constructions but are heavily influenced by the kinds of beliefs and reasoning schemas available in the individuals’ surrounding culture (Resnick, 1993). Individual and collective schemas are thus obviously mediated by cultural contexts, since organisational cultures are based on collectively held beliefs and values (where schemas or shared mental models are embedded) and these in turn generate norms of practice (Augoustinos et al. 2014).

Thus, cultures tie the actions of individuals to a particular group (or groups) and reveal, through justifications for group membership and the informal language that is used, what is collectively valued within the group (and what is not). Organisational stereotypes (or organisational myths and archetypes) also inform about what groups value (or indeed worry about). This idea of archetypes also fits with Dorothy Holland’s account of social identities. Holland draws on Geertz’s webs of meaning to describe cultures and identities made up of what she calls figured worlds.

Figured worlds take shape within and grant shape to the co-production of activities, discourses, performances and artefacts. A figured world is peopled by the figures, characters, and types who carry out its tasks and who also have styles of interacting within distinguishable perspectives on, and orientation toward it (Holland et al., 1998, p. 51).

Within such cultural productions “significance is assigned to certain acts and particular outcomes are valued over others . . . these collective ‘as-if’ worlds are socio-historic, contrived interpretations or imaginations that mediate behaviour” (Holland et al., 1998 p. 52). In my own work I found that shared war stories were also used to project the collective identity of two archetypes: the “gun controller” and the “adrenalin junkie”. In terms of what was valued in air traffic control performance a “Gun” controller was regarded as someone who demonstrates superb performance (such is their level of skill, ability and confidence) without even trying.

The gun controller was portrayed as having a limitless supply of energy, awareness and prescience, overcoming the limitations of the body and is never exhausted. In contrast, the negative construction of the gun controller is the adrenalin junkie. An adrenalin junkie was portrayed as someone who wanted to be a top performer (a gun) but who did not have the ability to support the performance.

In addition to culture, sense-making is influenced also by organisational structures when the activities of explaining, accounting for, and pattern generating are built into job tasks and roles.

For investigators of workplace learning, the contextual elements of organisational culture (such as collectively held beliefs, values and norms) are resources because they influence perceptual selectivity and the development of individual and collective schemas about work practice (Augoustinos et al. 2014). In addition to influencing events, collectively held beliefs and values will also be reproduced by individuals and groups in the kinds of continuous learning strategies used in work activity. Collective beliefs and values, therefore, will lead to some things being noticed – and indeed emphasised – rather than others. Thus, schemas and identities enable and constrain both individual and collective opportunities for learning.

This includes the sense-making not just of learners in the workplace but also of workplace instructors because their own reasoning processes about what is important will guide how they approach the trainee. From this point of view, acting subjects (which includes both workplace learners and their instructors), when engaged in their workplace activity (learning/instruction) will use strategies that are mediated by collectively-held values and beliefs and other artefacts of organisational culture, such as stereotypes and norms of practice (see for example Wertsch, 1998; Engestrom, 2004 and Bound et al Chap. 2, this volume).

In my own work I have found that instructors would sometimes use workplace learning to “weed out” those not conforming to dominant norms of practice or stereotypes because their performance did not meet with instructors’ conceptualisations about what was “good” performance (Owen, 2009a, 2017). This indicates that it is important to analyse the role of workplace cultures in enabling or constraining learning since what constitutes “good” is relational to the group. Moreover, norms of practice can also exclude key members of the group, for example women (Owen, 2012) in predominately “macho” workplace cultures.

Do existing workplace cultures need to change in order to enhance learning? Quite often within organisational culture literature, there is an implicit assumption that the existing community of practice or culture is appropriate and desired and “enculturation” is needed for newcomers to understand existing ways of working. However, these cultures may also lead to conformity (Balthazard et al., 2006), something identified as inhibiting the development of practices associated with continuous inquiry. Cultures can enhance learning, though they may also sustain existing patterns of belief and thereby learning to conformity, or non-learning (Balthazard et al., 2006). That is, culture may reproduce existing relations rather than change. Therefore, there needs to be a focus in examining what existing workplace cultures and identities may inhibit learning toward a future orientation.

One approach to changing cultures has been identified by Putnam and Borko (1997) of a cognitive-mediational program that encouraged teachers involved in professional development to interview someone who is likely to challenge their beliefs. One option for consideration includes having instructors examine their reasoning with other practitioners who hold opposing belief systems. Cognitive mediation is based on constructivism which suggests that all experience and learning is filtered by what the individual currently understands and believes. Constructivism has two forms: cognitive constructivism, which focuses on an individual's internal schemas and mental models for making sense of the world; and social constructivism, which emphasises the role of the social context in shaping what is learned (Putnam & Borko, 1997). Therefore, an individual's current belief systems are going to influence what that person accepts and learns. In addition cultural beliefs will enable and constrain what is observed, noticed and thus received (Resnick, 1993). Change can also be encouraged through getting workplace instructors to examine their practical arguments. A practical argument describes a person's reasoning about actions by specifying the rationales, empirical support, and situational contexts that serve as premises for the actions (Putnam & Borko, 1997). The assumptions behind such inquiry are that when instructors examine their beliefs with a valued other (e.g., a practitioner who is well regarded), then there is a critical examination of those beliefs that is likely to lead to a change in thinking, or at least a questioning of previous assumptions.

Experimenting in the Workplace

A final element essential in the learning process is experimentation. According to Kolb (1984), learning is limited if an individual formulates concepts to generalise to other settings, but fails to test their validity. It is contended that testing the validity of conceptualisations, based on reflections on experience, can be done through evaluating past experience and envisaging new alternatives to be put into action immediately or sometime in the future.

Envisaging new alternatives may occur also in thinking about past actions (reframing). In this case an expansion of the range of choices available might be made though they may or may not be acted upon in the future. Therefore, for the purposes of this discussion, the term "experimenting" has been emphasised because it can involve reframing actions that occurred in the past, action to be taken in the present and also it can mean developing choices to put into action in the future. Experimenting then, refers to developing choices and envisaging new ways of acting. These choices and alternatives are tested out mentally and/or practically through developing alternative plans of action for the future and acting on those alternatives when appropriate.

Expanding the range of choices and alternatives available is mediated by conceptualisation, which, as previously discussed, involves generalising concepts to new settings. Argyris (2004) proposed the idea of "single loop" and "double-loop

learning” as an indicator of the ways in which developing choices for future action was mediated by conceptualisation (or sense-making – see Chap. 6, this volume). Individuals and groups involved in single loop learning have limited alternatives and possibilities for action available to them because they operate without testing the basis of their understandings and assumptions (based on their beliefs and values) about the problem or situation. When organisational members have the awareness and ability to recognise their underlying assumptions and to test their validity, and modify their thinking, double loop learning occurs.

Organisational contexts enable and constrain opportunities for experimentation for both individuals and groups in a range of ways. Structures such as team-work, for example, increase possibilities for experimentation because they enable a shared continuity of experience to occur across team-members and thereby enable the experience to be used as a resource for inquiry to generate increased possibilities for action. However some teams may include dominant members who hold beliefs that reflection and learning is not important (e.g., the gun controller who has “the right stuff” and does not need to learn) may inhibit other members in their capacity to reflect. In this respect organisational culture influences individual and group opportunities for experimentation to the degree that such practices are enabled and constrained by collective norms of practice – shared conceptual schemas that account for how the world works as well as shared capacities for collective remembering. Similarly, policies and rules within a workplace may limit the capacity for to learn from others in the team if members are homogenous in their previous histories of experience rather than diverse. In this respect opportunities for experimentation are limited. Policies and rules within a workplace may also embed behaviours aimed at generating alternatives into job tasks and roles..

Opportunities for experimentation are mediated by the structuring of work experience as well as workplace cultures. It is important for facilitators of workplace learning and organisational designers to develop strategies needed to enhance intentional and shared experimentation. This is important to provide the future focus needed in workplace learning to practice continuous inquiry.

If new strategies are found to challenge existing conceptualisations then practitioners need to be given opportunities and encouragement to experiment with those changed practices in intentional ways and be given support until those practices become the norm. One means of doing this is to provide role models who display the kinds of thinking and practice that support goals of continuous learning, enabling participants to engage in private experimentation as they observe and learn vicariously.

Intentional forms of experimentation can be shared by creating emergent communities of practice that are supported as individuals and groups begin to learn new ways of acting and to develop new belief systems that accompany changed practice. Emergent communities of practice can be supported by workplace facilitators through follow-up sessions after accredited learning programs and these may be face to face or utilise other means of group discussion, through social media.

Moreover, at an organisational level, as a resource for learning, experimentation might take place intentionally or unintentionally. Investigating near misses and accidents in this respect can be thought of as unintentional experimentation which, although the outcome might not have been as intended, are nevertheless valuable opportunities for learning. What will be important in the future for organisational learning is for designers to look for ways to more consciously look for opportunities to use experience as a resource for experimentation, such as, for example, making critical incident analysis routine and part of the norm of practice.

Conclusion

In a globalised environment, learning is increasingly part of the currency of production. In the future organisations that are most productive will be those who understand the value of learning from events that happen in the workplace. This will be particularly so as work continues to increase in intensity in terms of demands and multi-tasking and when there is a need to be more efficient and agile.

It is not just specialized work environments that are becoming increasingly interdependent, mediated by complex technologies, undergoing work intensification and facing demands from ever more unforgiving political environments. These characteristics are now the feature of many work environments. The challenge for facilitators and designers is how to support workers in these contexts.

It will be helpful for facilitators of accredited workplace learning programs to consider:

- How the work is experienced and its implications for other processes of reflection, conceptualisation and experimentation;
- How reflection may be enabled or constrained by both organisational structures and cultures;
- What individual and collective sense-making occurs and what this reveals about individual and collective identity; and
- How experimentation is utilised for insights from engagement in these learning processes within and between individuals, groups, and organisational systems.

A key capability for the future of work will be the ways in which High-3 workplaces, especially those providing safety-critical goods and services, are steadily learning – at organisational, team and individual levels – to view “critical incidents” as valuable resources, as opportunities to advance learning and adaptation. While a detailed exposition of critical incidents as sites for experimenting with a range of scenarios is beyond the scope of this chapter it is worthy of mention here as critical incidents are resources available to High-3 workplaces. For these workplaces, a critical incident is in essence an externally imposed experiment, one that provides scope for organised reflection (and from this, reconceptualisation and action). An incident is an event – a temporally-discrete set of actions identifiable as being distinct from the usual flow of work practices. It is distinct in that the typical

rule-based work process elements loom as unlikely to address the challenge at hand. Instead, workplace actors are obliged to engage in “what if we did this?” reframing and to change the ways in which they would usually respond. An incident warrants the label “critical” when the actual/potential impact of the incident challenges key system elements including lives. However, an incident may also simply be a disturbance of some kind or an unanticipated novel problem that needs to be resolved.

All workplaces, not just high-3 ones, experience incidents. Many of these incidents may not be identifiable as “critical”, although most will test the knowledge base and skillsets of participants. Organisations committed to workplace learning will become adept in identifying incidents and can learn from them if these are interpreted as “imposed experiments” and will build structures and cultures that mandate and encourage facilitated reflection. They will also develop “preserving the scene” skills that allow key elements of incidents to be reliably stored for later (post-crisis) attention.

In public policy terms, there is substantial scope for governments and education providers to support workplace organisations in their journey along this path to greater experimentation (self-initiated or externally-imposed) and reflection. That support might include investigating and sharing examples of good practice from other workplace sectors and other jurisdictions, as well as formal approaches to the training of key workplace actors likely to play important roles in identifying, examining and reflecting on incidents.

No organisation can forego reliability. All industry sectors have a reliability component to them. Given that technological advances continue to influence all areas of work organisation, agile organisations need to consciously construct opportunities to reflect, make sense of and experiment with the experiences of those undertaking the work. However, this can only occur when organisations also have the conditions that enable learning.

If team members are to speak up about weak signals that something may be wrong in a process of learning-related work practice, or if organisations are to learn from events that occur then pre-requisites include a willingness to learn from violations, mistakes, problems encountered in the workplace. The ability to identify that problems are even occurring will be difficult in environments that are hostile, have limited reflexivity and cultures that do not support speaking up (Owen, 2009c, 2015). They will also be constrained by poor data collected on work practice. If problems are unable to be discussed, learning and change cannot occur. Making problems visible is therefore knowledge, intertwined within power relations (Owen et al., 2009; Adams et al., 2017). If workers feel that they will be exposed and vulnerable (because of organizational or public sanctions) for acknowledging violations in work practice, then doing so will be resisted. Such power relations are also socio-culturally constructed. If a problem made visible is at odds with the organizational culture of a particular group, then this too will be resisted by the workers themselves. Therefore, using workplace incidents as a learning resource can be problematic.

Designers of workplace environments need to take special care to evaluate the possible tensions and systemic or structural contradictions that are present to enable incidents to be named. Contradictions (that is, tensions in systems that are often contradictory) can be positive or negative in terms of opportunities for learning. A key question for designers is what are the conditions that lead to enabling learning from incidents and what elements in the existing workplace structure and culture provide affordances or constraints to doing so?

Continuous inquiry for organisational learning relies on cultures that support collective learning. Developing and improving the community of practice by “creating active and supportive climates for experiential learning ensures that experiential learning will be shared among team members that the practice community will be self-improving, and that system redesign will be ongoing” (Benner et al., 2006, p. 293). However, this will only occur in cultures that are ready to support inquiry and learning. If we are to enhance learning as a continuous process which is embedded in and supported by such communities, we need to understand what may impede both individual and collective learning. Teasing out the tacit and implied understandings which enable or constrain learning will contribute to the enhancement of learning as a continuous and iterative process which is intertwined with and supported by socio-cultural contexts and structures.

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