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Learning in the circumstances of work: the didactics of practice

Stephen Billett

Learning in the circumstances of work

1 Learning through work has been - and continues to be - the principal process through which occupations, that human society and individuals depend on, are developed. Therefore, understanding how people learn through their work and potentially seeking to improve that learning is important for a range of personal, workplace, community and societal reasons. It can assist individuals secure and sustain their employment, realise their occupational goals and contribute to the continuity of their workplaces. This learning also often serves the needs of their communities and nations. The services and goods provided by these workers are often essential to their communities and, collectively for the social and economic good of nation states. Moreover, the viability and continuity of those workplaces is also usually premised upon their workforce's capacities as work requirements change. Yet, preparing occupational capacities, extending further and sustaining them across working life have all traditionally been realised through the circumstances of work (Billett, 2010b). The term 'the circumstances of work' is adapted from the 'circumstance of practice' coined by the anthropologist Jordan (1989) and is used here to describe the range of situations in and through which paid work activities is undertaken. These are sometimes labelled as workplaces such as in: shops, factories, hospitals, schools, warehouses, hairdressing salon, offices etc. Yet, much work, and learning about it, is undertaken outside of these kinds of workplaces. For instance, for truck and taxi drivers, their vehicles are where they work and learn, as are the aeroplanes for those who pilot and attend to passengers in them. Then, there are sites of work that are temporary as in building sites, gardens being tended, offices being cleaned, and homes where patients and the aged are visited etc. There are those who perform their work largely alone and/or from home for instance, or in airport and on planes. Consequently, the term 'workplace' does not fully capture the range of physical and social settings where individuals engage in their occupations: paid employment. There is also

often a need to understand the kinds of engagements, relationships and interactions that comprise work, and through them individuals' learning. The work activities and interactions individuals engage in, as discussed below, are central to how and what individuals learn through their work. Hence, they constitute the key elements of didactics for practice-based curriculum and pedagogy, and are central to considerations of individuals' agency and personal epistemologies that guides their learning. Also, a consideration of circumstances accommodates the fact that these activities and interactions occur at particular moments in time, and in response to specific requests, needs or problems. In these ways, the term 'circumstances of work' are seen to be inclusive of the physical and social circumstances where occupational practice are enacted, the kinds of activities and interactions that occur and the dimension of time and societal imperatives that shape how they are enacted. Moreover, these circumstances and their attendant activities and interactions are central to the learning required to realise the abovementioned goals, even though this importance of this learning is not always recognised in an era of schooling. Therefore, for these reasons, it is essential that the processes of learning through practice be more fully understood, including identifying how experiences in the circumstances of work can be effectively to secure the kinds of learning workers want and workplaces and national well-being requires.

2 Consequently, the focus here is on a consideration of the didactics of practice: what might constitute a curriculum, pedagogy and personal epistemologies for the circumstances of work. Beyond important imperatives about improving learning experiences in practice settings are other and more encompassing conceptual concerns. Identifying how goal-directed activities and interactions support learning through practice also offers a means by which the process of human learning and development can be more fully understood. Freed from the constraints of learning through practice associated with educational provisions, the process of what constitutes human learning can be approached in a way that captures more typically how these processes progress.

3 In making its case, this paper is structured as follows. Firstly, after this introduction, the importance of reconsidering learning through practice in an era of mass education is discussed. It identifies a set of four premises why it is timely to reconsider learning in the circumstances of work. Then, secondly, two underpinning foundational concepts are advanced and discussed: i) the array of cultural, societal and situational factors that shape work practice and ii) the interdependence between these and personal factors that shape the process of learning through work. The former sets out the historically-derived, culturally shaped and situationally-manifested factors that constitute the character and requirements of occupational practices. Yet, to understand the enactment of work, its learning, remaking and transformation, it is also necessary to elaborate how human agents (i.e. those who work) engage in and with these practices and also learn in doing so.

4 Thirdly, elements of practice based curriculum and pedagogy, and workers' personal epistemologies are elaborated as procedural bases for the didactics of practice. The consideration and conceptualisation of didactics here is necessarily broad and not constrained by approaches, norms and practices occurring in the circumstances of schooling (i.e. educational institutions). Instead, the emphasis here is on the promotion of learning as founded in the organisation of experiences constitutes by the circumstances of work, the enrichment of those experiences and their engagement by learners. This includes the kinds and organisation of experiences -- referred to here as curriculum practices, the enriching of those experiences by others or particular activities -- referred

to here as pedagogic practices, and also the actions of those positioned as learners, -- referred to here as personal agency and epistemologies. So, although typically didactics are seen as being about direct teaching to promote learning, here the conceptualisation is far broader and inclusive of experiences afforded individuals and how they elect to engage with them.

Learning through practice in an era of schooling

> Education, in its broadest sense, is the means of the social continuity of life(Dewey, 1916: 2)

5 It is important, firstly, to remind those of us living in societies with universal compulsory schooling, and where tertiary and higher education is increasingly the norm (i.e. in the era of schooling), that the majority of learning for occupations across humanity has, and still continues to occur through the circumstances of work. The presence of institutions where learning is the principal focus (i.e. schools, colleges, universities etc) is a relatively recent phenomenon within human history, and mass participation in such institutions is very recent indeed. Across human history and seemingly in fairly uniform ways up until this present era of schooling in Europe (Greinhart, 2002), Hellenic Greece (Lodge, 1947), Mesopotamia (Finch & Crunkilton, 1992), Central Asia (Bennett, 1938), China (Barbieri-Low, 2007) and likely elsewhere, the learning of occupations providing food, shelter, protection, human care, cultural pursuits and means of protecting communities from physical and social threats have arisen through circumstances of work (Billett, 2010b)[1]. Also, the innovations, developments and refinements to these occupations have largely arisen and still arise through these circumstances (Jordan, 2011). So, more than just individuals' learning, the processes and outcomes of engaging in work extend to the remaking and transforming of those occupational practices as workers and their workplaces have confronted the requirements for continuity, technical innovation and through human invention. This learning and these innovations have largely arisen through engaging in occupational activities, attempts to secure occupational goals and through observation, listening and imitation (or mimesis), and direct guidance by more experienced familiars (Gimpel, 1961; Jordan, 2011; Pelissier, 1991; Rogoff, 1990). Consequently, a key means by which humanity has been sustained thus far and secured its achievements to date has been through learning within the circumstances of occupational practice.

6 However, a consideration of learning through work is more than historical curiosity about what occurred prior to the era of schooling. It is relevant and pertinent today. In contemporary times the vast majority of learning across individuals' working lives appears to be secured in similar ways. That is, whether focused on initially practising an occupation, developing further those occupational capacities (Billett, 2001b) or sustaining employability across working life (Billett, Dymock, Martin, & Johnson, 2009; Patrickson & Ranzijn, 2004) this learning arises through work-related activities and interactions. Importantly, there is no separation or categorical distinction between work and learning (Lave, 1993; Rogoff & Lave, 1984). Learning occurs continually through everyday work activities and across individuals' working lives. Yet, in contemporary times at least some of the learning required for work is now greater more demanding and profound than in earlier times given the frequency and extent of changes in these requirements (Barley & Orr, 1997; Martin & Scribner, 1991; Zuboff, 1988). This claim suggests that some of the

practices for supporting learning from earlier times may be no longer adequate, and that different strategies or approaches may now be required. So, there is a need to understand more about how individuals learn effectively in the circumstances of work in contemporary times and as requirements for work and participation in work activities continue to change. In short, we need an informed didactics of practice.

7 At least four imperatives are currently driving the need for an informed account of these didactics. Firstly, developing effective occupational capacities is profoundly important for fulfilling personal and societal needs. Societies need effectively prepared workers who can practice their occupations competently in meeting the specific, yet changing, service and production needs of their communities and nations. We require workers who are effective in growing, transporting, safely and hygienically preparing food, constructing strongly the buildings we live, engage in leisure and work in, constructing and maintaining the means to transports us on roads, water or in the air, and the goods and services we require, maintaining our health and intervening when we are sick, teaching children and adults, and providing for our cultural and aesthetic needs, to name but a few. Also, being adequately skilled is important for individuals' personal and professional well-being, the standard and quality of their working lives: achieving their vocation and securing their employability (Billett, 2011). This employability includes having the capacity to secure paid work; being successful in that work and securing levels of remuneration that meet their needs. Put plainly, developing effective occupational capacities is a profoundly important societal and personal project. However, experiences in educational institutions alone are increasingly seen as being unable to provide an effective preparation for these occupational capacities. As the circumstances of schooling (i.e. schools, colleges and universities) are different from those of work, the knowledge generated through activities and interactions through those experiences may not be readily applicable to the circumstances of work (Raizen, 1991; Resnick, 1987). Particular kinds of cognitive legacies (i.e. learning) arise from particular kinds of activities (Rogoff & Lave, 1984). Hence, those experiences that are substitute or inauthentic versions of what is to be experienced and required in the circumstances of work may not develop the capacities required for work performance. Consequently, in many countries, work experiences are now being provided for vocational and higher education students with the expectation that these experiences will be effective in securing the learning outcomes graduates require for a smooth transition into work (Eames & Coll, 2010). The ability to secure such outcomes through these is profoundly important and experiences in the circumstances of work are an essential component of developing the capacities that are required for effective occupational practice.

8 Secondly, workers need to continue to learn right across their working lives. In contemporary times, the ability to be employable across lengthening working lives (i.e. lifelong learning) requires on-going learning to address the changing requirements of occupational performance. Because each work situation likely requires particular sets of occupational and workplace capacities (Billett, 2001a), these requirements may need to be understood and engaged with in ways that support their learning (i.e. in and through the specific circumstances of work). Moreover, as people are working longer, both the scope and extent of learning across their working lives increases proportionately (Tikkanen, Lahn, Ward, & Lyng, 2002). The goals for this lifelong learning encompass for many workers the learning of entirely new occupations and, perhaps, more than once across a working life. Indeed, the concept of lifelong learning has been appropriated by global

agencies to address this concern (OECD, 2006). As employees aged over 45 years report, work based learning experience offer access to activities and interactions of the kind that can assist much of the learning required for this employability (Dymock, Billett, Martin, & Johnson, 2009). Given that circumstances of individuals' work provide opportunities for this learning, we need to know how it should be best realised.

9 Thirdly, there are both strengths and limitations to learning through work. Consequently, we need to understand more fully and inform about how learning in these circumstances can be made effective. For instance, authentic work experiences are generative for learning occupational practices through engaging individuals in tasks, observation and securing direct guidance from more experienced workers (Billett, 1994, 2001b; Eraut, 2007; Filliettaz, 2010; Marsick & Watkins, 1990). Yet, as discussed later, there are limitations to the effectiveness of these experiences (Billett, 2001b, 2001c; Marsick, 1988), not the least those shaped by the circumstances of the work practice itself (Darrah, 1996) or the practice of working communities (Somerville & Abrahamsson, 2003). Issues of learning within work intensive environments, hectic, differentiated, dynamic and unpredictable work circumstances, and securing access to knowledge that is not readily accessible through workplace situations are just some of the circumstances of contemporary work that can limit opportunities for learning. Yet, these circumstances of work also need to understood and be learnt about as they reflect the requirements for the work that individuals will need to initially learn about and then develop further their occupational capacities to meet.

10 Fourthly, the theoretical and empirical foundations for understanding and advancing learning through practice remain under-developed. Educational science itself is a relatively new discipline and is struggling to adequately explain how the organisation of, support for and realisation of learning within educational settings that exist purely for the promotion of students' learning (e.g. schooling, higher education etc) might best proceed. For instance, perhaps the most central concern of educational institutions is the ability to transfer the knowledge learnt within them to circumstances where that knowledge will be applied (Lobato, 2006). However, this is not as much a primary concern when learning through engaging in work activities, where application and learning co-occur. Hence, the concerns and imperatives are quite different from workplaces where learning occurs as part of another practice (e.g. the conduct of work activities), but is not its principal focus. Moreover, the educational discourse privileges particular kinds of learning associated with these institutions and their imperatives. Declarative forms of knowledge, those you can state, (e.g. propositions, facts, concepts) are privileged by these institutions' processes and practices (Prawat, 1989). Yet, the requirements for work performance emphasise procedural and dispositional dimensions of learning, such as haptic qualities (i.e. touch), the ability to work with others in achieving collective goals (Sinclair, 1997). However, educational science provides concepts (e.g. curriculum, pedagogy, personal epistemologies) that are helpful for describing and considering learning in the circumstances of work.

11 So, for these four sets of reasons outlined above, a more informed understanding about the nature of learning through the circumstances of work is now required. This alternative understanding includes considering the means by which that learning progresses in these circumstances, the distinct kinds of outcomes that need to arise and how best this learning might be realised. Therefore, in the next two sections, first, a range of sociocultural factors proposed as shaping work and participation in work

activities and interactions are discussed. Then, an account of how learning arises through a relational and interdependent process of individuals' engagement is then advanced.

Cultural, societal and situational factors shaping the didactics of practice

12 Given that learning and work co-occur and are dependent upon enactment of occupational practices, it is necessary to understand the form and dynamics of those practices. Indeed, their changing form, status and organisation all shape how participation in and learning through work co-occurs. Occupations are cultural artefacts that arise through human and societal need and exist because they meet or address particular societal purposes (Billett, 2011). Some occupations have existed across human history and are likely to continue do so. As noted, the need for basic human needs (e.g. food all year round, ongoing health care, personal needs, legal matters, financial management), as well as those associated with our well being (e.g. clothing, hair, transport) means that occupations addressing these needs will likely exist as long as humanity does. Nevertheless, even these enduring occupational practices are subject to transformation as social and societal imperatives change, and understandings and technologies modify. Hence, for examples, the shortage of doctors in some countries is leading to an expanded role for other healthcare practitioners, builders' work has evolved as technologies and construction techniques and regulations have changed, as is the case for printers, watchmakers for instance. There is nothing new about transformations in occupations reflecting societal needs. Indeed, across human history, some occupations emerged to address particular needs and subsequently disappear or only have lingering status (e.g. fletcher, milliner, potter, smith, mason cooper, miller etc) and are replaced by occupations that address emerging societal needs (e.g. software specialists, paramedics, pilots, educators). Moreover, occupations are positioned in distinct ways across different societies. So, in many countries nursing and midwifery are seen as being a paraprofessional occupation worthy of a university education, yet in others these occupations are held in lower esteem and status, and deemed not worthy of a university education.

13 However, beyond addressing specific human needs, occupations are also both shaped and transformed by societal developments, including their history, technology and population. For instance, the organisation of work and the concept of skilled workers developed distinctly within Western and Chinese traditions, possibly on the basis of differences in populations. Skilled craft workers in Europe required an array of skills to perform the entire tasks required of tradesworkers in their locales with relatively small populations (Deissinger, 2002). Yet, in Imperial China, the population was so large that the need to produce mass quantities of products arose far earlier than in Europe, and realised through teams of workers working together and contributing their specific set of capacities, (Barbieri-Low, 2007; Ebrey, 1996) rather than through solitary crafts workers fashioning the entire artefact, as in Europe. Indeed, the mass population and early development of metal working, porcelain, printing, woodworking and lacquer work in Imperial China was based on modular forms of construction, manufacture and even writing (Ledderose, 2000) that has only existed in western countries in the most recent of times and led to distinct premises in occupations and occupational practice. So, the occupations individuals engage in likely arise from societal need, are manifested in

particular cultural contexts, have standing and means of participation that are often societally-premised (Billett, 2011). Moreover, these factors directly shape or even regulate access to these experiences. The legitimacy and standing of occupations is linked to their perceived importance and potential consequences for the community or individuals and a degree by which they are codified and regulated. Beyond the immediate perils that novice pilots, builders, doctors, accountants might bring, there are also concerns about those who teach children, nurse the sick, care for the aged and disabled, etc. So, not all occupational practices are equally available to be engaged in and learnt about: i.e. accessed. In particular, occupations that are hierarchically ordered (e.g. health, military) or demarcated through historical divisions (e.g. trades work) or exercise potentially dangerous practices (e.g. electrical work, airline pilots), have regulated access. Put simply, the ability to access and engage in practice, participate in activities and interactions associated with the occupation mediates opportunities for individuals learning about those practices. For instance, learning a craft trade in many countries requires securing employment as an apprentice. Those unable to secure such employment cannot learn the trade, regardless of their interest in and potential to be a good tradesperson. In some countries, eras and situations, apprenticeships have been exercised within family or community (Aldrich, 1999). Here, being apprenticed is restricted to members of a particular community for sustaining customary practices (Singleton, 1989), or to respond to local imperatives of ensuring young people are effectively employed and prepared (Aldrich, 1999). So, access to opportunities for learning can be constrained by societal and situational factors. Ultimately, this accessibility is also shaped by the fluctuating societal demand for the occupation, and any constraints associated with accessing and engaging in it.

14 Yet, beyond the manifestation of occupations in a particular country or region and era, is how they are enacted in a specific workplace at a particular point in time: the circumstances of work. Such are the diverse situational requirements, kinds of activities being undertaken and imperatives of the particular circumstances that they constitute the manifestation of occupational practice and what constitutes its performance requirements. Moreover, it is in these circumstances that work and learning co-occur. The practice of hairdressing across four different hairdressing salons in different locations, for instance, was found to be quite situationally-distinct in terms of goals, range of activities, workplace practices, clientele, location, and interactions among employees and between clients (Billett, 2001a). Because of these situated requirements for performance, a particular hairdresser's capacities would not easily adapt to practice in another salon. Whilst all of these practitioners might be able to perform the procedures required of hairdressers (i.e. cutting, shaping, colouring hair), commonly understand the precepts for practice (i.e. identity what your client wants and respond), and the dispositions associated with such a form of service occupation, there were profound differences that would defy the ability to be successful by merely shifting locations. In one salon, the hairdressers needed to know well their clients' life histories and families, because companionship and social engagement was a part of the hairdressing task. Many clients were lonely old widows who came as much for companionship and to meet friends, whose appointments were scheduled at the same time. Consequently, without knowing the clients' personal histories, their hairdresser cannot fulfil the goals associated with this social intimacy, because they would lack appropriate familiarity.

15 So, what constitutes domains of work activities is not limited to the exercise of canonical occupational knowledge. There is a complex of situational factors that determine performance requirements in the circumstances of work. These circumstances are those in which the occupational practice is enacted, judgements made about performance will be assessed. What constitutes expertise is the ability to reasonably successfully negotiate non-routine domain-specific problems within a domain of activities (Chi, Glaser, & Farr, 1982; Ericsson & Lehmann, 1996). Yet, this expertise is premised on a profound knowledge of the domain of activities in which the problem-solving occurs. Hence, the capacity to be an expert practitioner is likely to be quite situational and arises through engagement in those circumstances (Billett, 2001a). Therefore, in these ways, the circumstances of work are central to its enactment, remaking and transformation, as well as learning about and for it. The important point here is to understanding learning through practice is that the particular activities and interactions that comprise what individuals will encounter and from which they learn. As discussed later, the organisation of experiences from which individuals learn – the practice curriculum – in providing opportunities to observe, listen and practice are shaped by these situational factors. Therefore, more than being a set of social circumstances, the particular circumstance of work is central to the experiences provided for individuals to engage and learn through practice, as these two processes co-occur. This includes who is allowed to engage in it, what kinds of activities and interactions are afforded, and for what reasons, and the kinds of guidance from more experienced co-workers: i.e. the workplace participative practices (Billett, 2004; Billett, Barker, & Hernon-Tinning, 2004).

16 In sum, the organisation of those experiences and ability to access and learn an occupation and go beyond how the particular circumstances are shaped by the set of cultural, societal and situational factors that comprise the circumstances of work. How these factors are engaged with by those individuals who work and learn stands as a key premise for learning through practice. Hence, in the following section the processes of learning through and for occupations in the circumstances of work are elaborated.

Learning through work: interdependence between societal and personal factors

17 Given what is stated above about work and learning co-occurring, understanding learning through work requires considering contributions of the social and physical circumstances in which their work occurs and where individuals engage in them, and the relations between these two contributions. This learning is proposed as being interdependent between individuals who engage as learners, workers and practitioners in the circumstances of work and enact, remake and transform that practice and, learn from it, on the one hand, and the social and physical circumstances comprising those circumstances on the other (Billett, 2003). Rather than proposing these as dualisms between these personal and institutional factors, these are held to as a dualities that are interdependent, albeit relationally. To be precise, institutional facts (Searle, 1995) such as occupational practices need human agents to enact, remake and transform them as requirements change. Yet, at the same time, individuals require those practices to meet their economic and societal needs, albeit in personally distinct ways. So, they are interdependent. Moreover, to forestall easy and unhelpful criticisms, the personal here is seen as being the epitome of the social. That is what constitutes individuals, their sense of

self, subjectivities, capacities and intentionalities arise from their socially-shaped personal histories or ontogenies(Billett & Pavlova, 2005; Cavanagh, 2008; Fenwick, 1998). These ontogenies are premised upon a lifetime of engaging with social contributions comprising their ontogenetic development that arises through individuals' multitudinous and ongoing interactions with the social and physical world that constitutes their moment-by-moment learning (i.e. micro genetic development or microgeneses). Consequently, how individuals engage with the circumstances of work is shaped by personally unique socially-shaped (i.e. ontogenetic) premises that arise and are themselves transformed through the accumulation of socially-derived experiences. This experiencing is mediated by what Valsiner (e.g. Valsiner, 1998; Valsiner & van der Veer, 2000) refers to as individuals' cognitive experience: how individuals construe and construct experience. The relational dimensions of this interdependence are those between institutional and personal facts comprising the ongoing process of uniquely socially-shaped individuals engaging with what they experience when enacting, remaking and transforming their occupation in a particular set of circumstances. Much understanding of learning through socially-derived practices (e.g. work) has arisen from anthropological accounts. Anthropologists are concerned about how cultural practices are formed, enacted and transformed, and learnt by those who practice them, and have provided important insights about the organisation, practices and enactment of experiences and processes through which occupational capacities are learnt and extends to identifying ways in which these kinds of learning are supported(Goody, 1982; Jordan, 1989; Pelissier, 1991; Scribner, 1985). They have noted, for instance, processes of observation, listening and imitation/practise as being central to how novices engage and learn in such practices. Some anthropologists have also attempted to understand how these experiences actually lead to the human processes of learning these practices. They note the need to go beyond observable individual or cultural, societal and institutional purposes and practices. Instead, there is a requirement to also understand the internal processes of how people come to learn, beneath the skin, through participating in activities and interactions in cultural milieu.

18 A helpful concept arising from Vygotskian-derived socio-cultural theory is that processes of learning through practice can be described as being inter-psychological -- between the person and the world beyond them -- leading to intra-psychological outcomes (i.e. change within individuals). When individuals engage in socially-derived goal-directed activities more than completing that task, there is a legacy (i.e. learning) that arises through completing those activities. In this way, social contributions become embodied by and part of individuals' cognitive experience. Or, as suggested in an anthropological account, the activities humans engage in structures their cognition (Rogoff & Lave, 1984). Yet, to understand this process of learning requires accounting for the particular inter-psychological processes that occur when individuals learn in the circumstances of practice and also those that comprise intra-psychological processes through which individuals come to construe and construct their learning. That is, we need to know how individuals process what is experienced socially.

19 Another important reason for emphasising intra-psychological processes is the need to account for non-propositional forms of knowledge and knowing. Beyond focussing on declarative knowledge (i.e. facts, concepts, propositions that can be written down or stated), there is also a need to account for knowing in the forms of enacting both body and mind. Work tasks comprise engagement in intentional goal-directed activities

requiring conceptualisation, use of procedures and engaging the body in securing those outcomes that are the very processes of extending what we know (i.e. learn). Yet, descriptions of these activities are often overly taken with declarative forms (Lakoff & Johnson, 1999) that stand as a criticism of educational provisions and a reason why so much of what is learnt in them is not applicable to circumstances beyond them. As Ryle (1949) proposed, key qualities of non-declarative learning comprises much of what individuals use and engage when participating in goal directed activities, such as paid work. These non-declarative elements, along with declarative elements, comprise the procedures and dispositions that individuals utilise to do things and in ways central to their learning (Lakoff & Johnson, 1999). Indeed, to perform tasks effectively requires opportunities to repeatedly rehearse them. Through attempting to approximate tasks that have been observed and/or modelled by others, and through opportunities to repeat and improve our performance with those approximations of the modelled or observed task (Gott, 1989) we come to learn how to perform those tasks. This process includes the learning of procedures that become proceduralised and which occurs in ways that are not statable as is the case with performance of these tasks (Anderson, 1982; Sun, Merrill, & Peterson, 2001). Consequently, the opportunity to observe and engage in practising those activities and in circumstances where their applicability can be monitored and appraised by learners and others is central to learning through increasingly mature approximations of modelled tasks. It is these opportunities that can be a distinguishing quality of learning through engaging in the work activities. Indeed, anthropological studies have consistently proposed that much of learning in non-school situations occurs in these ways (Jordan, 1989; Lave, 1990; Pelissier, 1991), and is supported by more recent accounts (Jordan, 2011; Marchand, 2008).

20 Indeed, a consistent view arising from the anthropological and other accounts above is that observation, listening and imitation constitute the most common and important didactic practices in work settings. Yet, such a model of didactics is largely premised upon the learners and their capacities to observe, imitate and then hone their performance. As noted, much of this capacity is aligned to development of capacities that are not able to be declared. The Daoist philosopher Zhuangzi (369-286 BC) used a parable of a wheelwright to describe the power of this personally developed and non-declarative form of knowledge, such as haptic capacity, over what is found in and learnt through books (i.e. propositional knowledge).

> I see things in terms of my own work. When I chisel at a wheel, if I go slow, the chisel slides and does not stay put; if I hurry, it jams and doesn't move properly. When it is either too slow or too fast, I can feel it in my hand and respond to it from my heart. My mouth cannot describe it in words, but there is something there. I cannot teach it to my son, and my son cannot learn it from me. So, I have gone on for seventy years, growing old chiselling wheels. The men of old died in possession of what they could not transmit. So it follows that what you are reading are their dregs." (cited in (Ebrey, 1996): 49)

21 Yet, whilst this vignette emphasises the kinds of knowledge or knowing required for many kinds of occupational performance, and reminds of the tacit and haptic qualities required to be learnt, this does not preclude the possibility of assistance in their learning by a more expert partner. Indeed, some suggest that, observation and imitation are insufficient, and that instruction and guidance is also required to develop the capacities to perform particular tasks. Gowlland (2011) and (1989) both note the importance of direct guidance and instruction in the development of skills associated with pottery and

porcelain manufacture. They report how an experienced worker or master potter intervenes and even hold the hands of novices to assist them achieve the kind of shapes that are required. The placing of the masters' hands upon those of the novices provides a form of demonstration, close guidance and also seeks to assist the development of a form of knowing which cannot be taught: the haptic quality - the sense of touch. Achieving the kind of haptic capacity, which is central to many forms of craft and human service (e.g. midwives, doctors, physiotherapists, and masseurs), is often seen as being something that cannot be taught. It has to be learnt. Yet, the point here is that it may be possible for such learning can be assisted by others (e.g. Gowlland, 2011 and Singleton,1989) propose, albeit using pedagogic practices that are targeted and suited to the circumstances of work.

22 In all, it is suggested above that, together, contributions from both the world beyond the individuals, and also their capacities and processes are central to learning much of the knowledge required for work. Indeed, given all of the discussion above, it seems now appropriate to turn to outlining what constitutes the didactics of practice, as a means of both capturing and progressing the previous discussion.

Didactics of practice: Everyday and intentional curriculum, pedagogic and epistemological practices

23 Some foundations for what constitutes the didactics of practice are advanced in this section. Such didactics need to be premised on considerations of learning in and through the circumstances of work, rather than those of educational institutions. As noted, a key difference between the learning in the circumstances of work and educational institutions is that, in the former, learning and the work that comprises the principal purposes of the setting co-occur. Hence, opportunities for learning and ways of engaging are shaped by requirements and situational factors where they are enacted: the circumstances of work. Yet, it is imprecise, unhelpful and incorrect to view these circumstances as being informal, ad hoc or non-formal because are structured by these requirements, provide access to learning through relevant experiences and can lead to adaptable outcomes (Billett, 2002). Further, there can also be intentional efforts to promote and support learning in these circumstances of work that augment the contributions of the everyday work activities and interactions that freely occur. Consequently, as a means of proceeding to outline what constitutes these foundations here, considerations of curriculum, pedagogic and epistemological practices that constitute the didactics of practice are advanced in terms of both everyday and intentional practices. It is accepted that there is some overlap across these two ways of ordering an account of these didactics. Yet, they also provide a framework within which to consider how the enactment occurs, can be evaluated and potentially enhanced. This distinction is also identified, within anthropological studies, culturally derived practices that identify certain practices as being learnt through participating in everyday activities and life (Marchand, 2008; Rogoff, 1995), and those associated intentional and organised learning experiences (Bunn, 1999; Gowlland, 2011; Rogoff, 1995; Singleton, 1989), and on these bases are discussed here.

Everyday curriculum, pedagogy and epistemological practices

24 Much of the learning required for effective work practice can arise through normal or everyday participation in work activities and interactions, as noted above. In ways quite analogous to anthropological accounts, investigations of individuals' learning through the circumstances of work from socio-cognitive traditions found that workers report the contributions to their learning through work comprising: i) engaging in work activities, ii) access to direct and indirect guidance, and iii) opportunities to practice (Billett, 2001b). These investigations found that, firstly, the circumstances of work provided access to authentic goal-directed work activities and interactions in which workers of different kinds engaged in and from which they learnt. These social and physical settings afforded contributions that provide access to artefacts, informed interlocutors and situationally pertinent goals for achieving and monitoring performance. These activities are of the kind that likely ground cognition (Barsalou, 2008) and lead to the sorts of learning securing many of the capacities required for performance in that setting, because of the personal legacy (i.e. learning) is shaped by the activities and interactions that are a product of these social forms and practices. Put simply, the evidence consistently suggested that working and learning co-occurred and were shaped by what was afforded workers and how they elected to engage with what was afforded them.

25 Secondly, such engagement also provides access to understand the circumstantial requirements for performance, including the practice of the work community (Gherardi, 2009) in which that performance is grounded. Moreover, these authentic circumstances also assist (i.e. mediate) this learning through the provision of clues and cues that assist identify both goals for learning and the means by which activities progress and outcomes (i.e. learning) are secured. This mediation includes examples of completed or half worked tasks that become models and goals to inform and provides bases for individuals to moderate their own performances. In doing so, they afford forms of distal or indirect guidance that assist learning through processes of observation and imitation. This indirect guidance is also sometimes augmented by more direct guidance by more expert co-workers who are able to assist learning inter-personally when discovery alone is insufficient (Billett, 2000; Brown & Palinscar, 1989; Rogoff, 1995). Opportunities provided to repeat and rehearse work tasks also assist in the process of procedural and conceptual development. Such rehearsal also generates honed procedures (Anderson, 1982) and secures conceptual associations and links (Roth & Roychoudhury, 1993). Consequently, as such opportunities are often afforded in work settings; these are helpful in supporting learning practices that have their source in the circumstances of work.

26 Thirdly, the robustness of the knowledge – the degree by which it can be subsequently used – is premised upon its perceptible grounding in situations to which is to be projected. That is, situational factors shape performance requirements that cannot be understood or responded to effectively without knowing and experiencing these requirements (Billett, 2001a). The richness of these experiences also assists the process of grounding cognition and how individuals process what they experience (Barsalou, 2008). Because individuals need to come to know situationally-specific requirements, the ability to comprehend and monitor how their approximations of workplace tasks are able to realise those goals are supportive of this kind of learning (Billett, 2001c), as they need to be experienced and learnt, and likely cannot be taught. Fourthly, these authentic

activities are reported to be highly engaging and worthy of effort by workers of all kinds and across sectors because they are associated with activities with which learners want to perform effectively (Billett 2001a). Through such engagements, effective (i.e. well-grounded, compiled, linked) learning will most likely arise. No amount of invitational qualities or support will constitute an effective learning environment unless individuals elect to effortfully engage with what is afforded them.

27 In short, indirect guidance such as observation and opportunities to practice (i.e. imitate and engage in increasingly mature approximations) provide access to the kinds of goals that learners need to direct their efforts. Engagement in goal-directed activities and interactions in the circumstances of work provide bases for engaging in and learning about and how work activities occur. They can also provide the vehicle through which understandings develop and approximations of procedural competence can improve, be refined and honed (Sun, et al., 2001). This conceptual and procedural development is also supported by engagement with other and more experienced co-workers who can assist learners develop the knowledge they will not secure through discovery alone. As noted, the knowledge required to be learnt arises through history and culture and is manifested in particular circumstances (e.g. circumstances of work), not from within the individual, who have to access and learn the knowledge they require to perform effectively. It is also unhelpful and unnecessary for individuals to engage in reinventing knowledge that has evolved over time and has been refined and honed in response to changing occupational requirements. Yet, also evident in these processes of learning through practice is the foremost and explicit need for learners to engage actively in the learning process and seeking to secure the kinds of knowledge they need to perform effectively.

28 So, there are curriculum, pedagogic and epistemological dimensions to the didactics of learning through everyday practice in the circumstances of work. By curriculum, is meant the arrangement of experiences in which individuals engage to access and secure the knowledge required for work performance. The pedagogic practices are those contributions that serve to enhance or enrich the learning process albeit provided by more experienced workers, co-workers and also the activities in which individuals engage. Then, is the means by which individuals exercise their agency in construing and constructing the knowledge afforded them: their personal epistemologies. Each of these is now briefly discussed in terms of what everyday work activities and interactions.

Curriculum practices in the circumstances of work

29 The original meaning of curriculum is a pathway or a track to follow (Marsh & Willis, 1995). This conception provides a strong basis for understanding how curriculum practices are constituted in the circumstances of work. For instance, the ‘learning curriculum’ was proposed by (Lave, 1990) through what she found in her study of apprenticeship learning of tailoring in Angola. She noted that these novices progressed through a series of work activities that were structured to support the learning of tailoring. The structuring of these activities allowed the apprentices to initially understand the goals (e.g. standard of work) and outcomes of the work in which they were engaged and also permitted them to progressively participate in activities organised on the basis of difficulty and tolerance of error. Progression along this path of activities was premised on being able to effectively complete tasks of increasing difficulty and that had higher error cost (i.e. consequences when mistakes were made). Similar

arrangements have been identified in other cultural practices and occupational fields including the manufacturing of pottery in Japan (Singleton, 1989), the building of minarets (Marchand, 2008), in the production and packaging of food products (Billett, 2000), and how hairdressers learnt their skills in hairdressing salons(Billett, 2006). In historical accounts, these kinds of arrangements have been identified as the perennial means for learning crafts within family and commenced with children engaging in play-like activities associated with the family's business, as exampled in early India (Menon & Varma, 2010) and in Hellenic Greece (Lodge, 1947). As Lodge writes of learning crafts in Hellenic Greece:

> The son learned his trade by growing up in his father's family and participating in the family activities, imitating what he saw his father doing. At first the imitation would be playful and childish, carried out with such toy tools as a child could handle. Later it would become more deliberately purposive. Practice produced technical proficiency in details and the growing boy would act first as his father's 'helper', then as his associate, and would eventually himself become the head of a family, and the centre from which further training in the family craft would radiate. (Lodge 1947: 18)

30 So, the key feature of this work-premised curriculum is a pathway of activities moving from being those that can be easily undertaken by novices, and where mistakes can be tolerated and opportunities to practice are provided, and then progressing slowly through to engaging in more demanding activities that require greater levels of skill and build upon understandings and practices developed earlier in the pathway. For instance, Marchand (2008) refers to the earlier development of understanding about stone, cement, structure and work organisation later assisting apprentice minaret builders move to roles that ultimately permit them have to the proximity to and then engage in constructing the most important parts of the minaret (i.e. the outside walls). In my own work life, when first employed by a large clothing manufacturing company as a trainee designer, my initial tasks in the design room were ordered in a similar way. Firstly, I was given interlining patterns to prepare. These components have to sit within the cloth components, so there were clear parameters I had to work within, yet smoothness of cut was not crucial, and small inaccuracies were tolerable. In addition, this task allowed me to learn to use pattern shears accurately and effectively. Next, I was permitted to prepare pattern components for waistcoat and jacket linings. These components need to be prepared in a way to not constrain the outer components of garments; so again, there were particular requirements to be met. Next, I was allowed to prepare patterns for cloth components starting with small component pieces before moving onto larger ones (e.g. foreparts, backs and sleeves). Only after much practice was I permitted to prepare collar components, which was seen as being the most intricate and also the most prone to significant consequences if made incorrectly. However, before working in the design room I was engaged in a process of learning about the manufacturing processes within this company through an intentional learning experience in three manufacturing areas (see below).

31 So, there are bases in the organisation of novices' activities that are part of the circumstances of work that can structured and can assist their learning experiences in ways that comprise a curriculum for the circumstances of work. It is this ordering through the curriculum that provides and sequences the activities and interactions from which individuals learn their occupational capacities.

Practice based pedagogy

32 Pedagogy is the means by which learning experiences are enriched in some way and most likely goes beyond the mere provision, organisation and sequencing of experiences in the circumstances of work (i.e. the practice curriculum referred to above). As noted, much of the learning processes in work comprise observation, imitation and practice by learners. Hence, the practice pedagogy is very much premised upon learners' actions, but supported by observing and engaging with others and workplace artefacts. Close indirect sources of learning support (e.g. observation, listening) and guidance by more experienced workers whether in the form of interpersonal assistance (e.g. coaching, direct modelling, scaffolding) are consistently reported as providing access to and the means of engagement much of the knowledge required for work, as noted above. This pedagogy can also be enriched by particular work activities through which individuals come to engage, utilise, articulate, test, predict outcomes and monitor their progress. For instance, particularly rich pedagogic work activities are those meetings where workers have to discuss work activities, evaluate their approaches and consider the viability of options. These activities permit novices to engage in a process of aligning and reconciling what they know with what is being discussed or enacted, and then construct responses as a result of these interactions. Nurses' handovers are an example of such events. At these handovers, there is often a five stage process that is inherently pedagogic. Firstly, the patient is discussed in terms of their age, gender, circumstance and capacities etc. Then, the condition or conditions of the patient are stated, followed by the treatments they have been prescribed and are being progressed. Following this the patients' progress with these treatments is then presented and evaluated and then, finally, the prognosis -- likely outcomes for the future, are discussed, in which predictions are made, discussed and evaluated. All this comprises a rich pedagogic experience that affords opportunities for novices to engage in different ways and with particular levels of understanding and knowledge of procedures. Individuals can align what they know with what is being discussed, evaluate the options being advanced, and then reconcile what they do not know or are uncertain about, and through following and evaluating the discussions also access and make judgements about conceptions, procedures and postulated outcomes. Together, these experiences can assist in processes of knowledge construction associated with their viability (Van Lehn, 1989) or to overcome disequilibrium with understanding (Carlson, 1997).

Personal epistemology

33 As in these handovers, much of the learning through everyday activities and interactions in the circumstances of work are dependent upon how learners engage with the activities and interactions they are afforded. Just as in education, learning through the circumstance of work are merely invitations to change. The kinds and qualities of learning that arises are largely dependent upon how individuals take up those invitations. Commonly, learning through everyday work activity is reportedly shaped by learners' observation, imitation and practice largely mediated by their own agency, interests, intentionality and energy. Repeatedly, the importance of effortful engagement in learning in the circumstances of work has been emphasised in the studies reviewed here and for reasons mentioned above about self, competence and basis for peer respect.

Moreover, there are also instances in which individuals have exercised extreme levels of agency to direct their learning in and through work to secure personal goals associated with employment, advancement or achievement (Billett, 2000).That is, the intentions for learning are shaped by the need to achieve workplace goals, being seen by others as being a worthy worker and recognised as such (Chan, 2009) and directed by what they are assent to being their vocation. This active process of meaning making is described as being a process of implicit learning (Bunn, 1999) and because of the lack of direct guidance, even apparent 'stealing' of knowledge from more experienced workers might be expected (Marchand 2008) because it is deliberately not explicitly shared.

34 In these ways, some premises for curriculum, pedagogic and epistemological practices constituting the didactics of learning through everyday work activities and interactions have been set out above. However, in the past, and perhaps increasingly now, it is necessary to provide intentional experiences and support to assist access to and guidance by more experienced co-workers. Some reasons that such support has been necessary in the past and now through the use of intentional curriculum, pedagogy and epistemological practices in workplace settings are to: i) meet the demands and complexity of the knowledge to be learnt, ii) overcome the limitations of learning through practice that have been identified, and iii) address the emerging requirements for effective work practice. In the next and final section, these intentional premises for the didactics of practices are set out.

Intentional curriculum, pedagogy and epistemological practices

35 There are particular reasons why intentional arrangements have been organised in circumstance of work settings to support learning. For instance, Bunn (1999) identified that although many practices Kyrgyz nomads needed were learnt through participation in them, others demanded intentional and structured forms of preparation. Some of these learning processes were long term and required particular and specific processes of learning (e.g. eagle hunters having to capture and raise an eagle chick). Moreover, the ability to access models in the form of skilled practitioners and have the opportunity to engage in joint or collaborative work with them aided the potency of these learning experiences beyond the knowledge that can secured through discovery alone. Then, there is the need to overcome the limitations of learning in the everyday circumstances of work. Studies investigating learning through work across a range of occupations and industry sectors, identified some commonly occurring limitations of learning in the circumstances of work (Billett, 2001b). These limitations included: i) learning that is inappropriate, ii) access to activities and guidance, iii) understanding the goals for workplace performance, iv) reluctance of experts to provide guidance, v) absence of expert guidance, developing understanding in the workplace and vi) workers' reluctance to participate in work-related learning. These limitations can be categorised into those associated with outcomes and processes. These two sets of limitations are now briefly discussed.

36 In consideration of outcomes, it was found that individuals can learn inappropriate and unhelpful knowledge through workplace experiences. This inappropriate learning includes the learning of practices and procedures that are substandard, dangerous or are

inadequate, including unhelpful or dangerous shortcuts that restrict the effectiveness of individuals' skills and leave them prone to making errors. Whilst there are diverse views about what constitutes effective and ineffective work practices and appropriate or inappropriate learning, some practices were identified as being potentially dangerous or 'bad' practices. Learning of unsafe or dangerous practices was reported as being supported by masculine culture in coalmines, for instance (Somerville & Abrahamsson, 2003). Many workers also reported learning to undertake work tasks, but not understanding why they are doing them (i.e. goals states and practices)(Billett, 1994). This lack of understanding limited how they subsequently engaged in these and other work tasks. For instance, in a food processing plant, some workers were not fully aware of processes that occurred later in the production process. Yet, this lack of awareness inhibited some production workers understanding of the work goals they were collectively trying to achieve. But, more fundamentally, many concepts underpinning effective work such as hygiene, force, power, structural vectors, the internal workings of machines and other materials that workers engage with (e.g. hair structure) are not to be observable and accessible through everyday practice. Therefore, they became difficult to learn through everyday work activities. In this way, it was found that not all forms of the knowledge required for work performance can be accessed in the circumstances of work because they cannot be observed, experienced and engaged with, and therefore learnt. Noteworthy here is that, increasingly, the workings of technology and processes that underpin many contemporary forms of work are opaque and not easily accessible. The workings of contemporary motor vehicles, lathes, and any computer applications may well be hidden from view and easy means of experiencing. Consequently, for reasons such as those set out here, it is necessary for there to be an intentional curriculum, pedagogic and epistemological practices to support this learning in the circumstances of work.

Curriculum as intentional practice

37 A range of arrangements providing learning experiences exist that sit outside of normal productive work activities, and yet need to be intentionally. Such curriculum pathways that have been used in recent times are to address particular kinds of learning needs. For instance, hospital-based nurse preparation typically involved trainee nurses rotating through a series of hospital wards that afford access to a wide range of nursing experiences. Quite intentionally, these learners rotate through wards with specialisms in birthing, oncology, orthopaedics, respiratory and heart, and mental health etc, and also work in an emergency care units etc. So, their pathway of activities ad interactions (i.e. curriculum) is directed towards them having experiences across a range of circumstances where nursing is practiced in distinct ways. A variation of this pathway is what occurred within some group apprenticeship schemes where, rather than them learning in just one circumstances of work, apprentices move across workplaces and engage in different roles within those workplaces. In the hospitality sector such rotations might include an apprentice chef having periods of time working in a major hotel, inner-city restaurant and, perhaps, also a large catering facility, such as a hospital or military base. In the former, they might commence working in the banquet kitchen preparing large numbers of the same kind of meal, before moving into the bistro where light meals are were cooked and then into a restaurant where meals are made to order. In addition, these apprentices might also spend time working in a restaurant in inner-city area and

experienced in dealing with the demands of the intense work that comprises lunchtime or evening meal service. Then, they might experience providing large numbers of meals to military personnel, addressing the special dietary needs of patients in hospitals etc. These again provide experiences of distinct ways in which chefs work.

38 As foreshadowed, I experienced a structured form of workplace curriculum of this kind when employed by large company in the clothing industry as a trainee designer. Despite my college experiences and having worked in another manufacturing setting, this company organised for me to spend approximately three months working in the production plant to learn about how this company made its garments. This comprised working progressively through the workstations in three production lines producing, firstly, trousers and then waistcoats before going on to the jacket plant. In each production line I engaged in the same activities as a production machinist, except that I progressed through the stages of garment production in each of the production lines. The purpose here was for me to develop a rich understanding about how the garments were manufactured so that my work in the design room would be informed by that knowledge. This was a particularly rich learning experience that had robust outcomes (i.e. I transferred them to other circumstances). It also provides a good example of a pathway of experiences that comprise an intentional practice-based curriculum. It is these kinds of experiences that can also be built upon through the use of intentional pedagogic practices.

Intentional pedagogic practices

39 Pedagogic practices are those that enrich the prospects for and processes of learning, as defined above. These practices can be quite intentional in practice settings and be directed to achieve specific purposes. Anthropological studies indicate that intentional interventions such as to assist learning in the circumstance of work have long existed. The use of beach flotsam to depict the location of stars and star patterns to assist novice fishermen learning to navigate in Micronesia is an example of this intentional pedagogic practice (Pelissier, 1991). Also, as mentioned, masters directly assisted novices in the production of pottery and porcelain by placing their hands upon the novices and guiding the novices' forming of artefacts from clay (Gowlland, 2011; Singleton, 1989) is another example. There are also long-standing practices that have been used to assist individuals learn that have now become commonplace and might be seen as being part of everyday commonsensical practice in some work settings. These include the use of modelling, coaching and the gradual withdrawal of support (i.e. scaffolding) is well established and understood practices in some workplaces. Nevertheless, these kinds of strategies, which have risen through apprenticeship type arrangements such as those widely practised in Europe, may require intentional interventions such as the preparation of workplace staff to use and engage with them. Of course, many skilled workers would have experienced the support and guidance provided by these kinds of pedagogic strategies in their apprenticeships. However, other kinds of workers and in different places may not have experienced support of this kind. Therefore, it may be necessary to assist workers to provide this kind of guidance to novices, and also for novices to be aware of this form of support and how they should engage with it (Billett, 2000). Yet, given the need to understand 'hard to learn' knowledge in contemporary workplaces, it may be necessary to go beyond the use of these pedagogic strategies. Indeed, strategies such as analogies,

questioning, generating representations in the form of diagrams and providing clear explanations, have been used with positive outcomes (Billett, 2000). There is also a range of intentional strategies such as shadowing, job rotation and mentoring that can be undertaken in the circumstances of work that need to be enacted outside of the normal requirements of work activities and interactions. Such pedagogic practices will also likely require some form of preparation for those who are to enact them as part of their everyday work activity (i.e. mentors, supervisors etc). Hence, there are a variety of intentional strategies that can be used to enrich the learning in the circumstances of work, including overcoming some of their inherent limitations.

Agentic engagement as a personal epistemology

40 The effectiveness of intentional curriculum and pedagogic practices overviewed above is reliant upon the capacities of and engagement by both those who provide them and those who learn from them. Those who are supporting learning in the circumstances of practice likely need to accept the worth of that learning understand its purposes and be competent in their practices and secure opportunities for them to occur. However, most importantly those who are learners need to engage agentically in these kinds of experiences and forms of support. That is, their participation needs to be effortful, focused and intentional. Developing occupational capacities in the circumstances of work can also be seen as being primarily about learning, not teaching. In many, perhaps most circumstances the practicalities and possibilities for adopting teacherly practices are very limited or non-existent in the circumstances of work. Therefore, learners are required to engage with what is afforded them effortfully to secure the kinds of learning that will sustain their employability and advancement. That is, they need to energetically and agentically take up the invitations being extended. Given that learners in contemporary times have done so in the era of schooling, it may be necessary to support their capacities to be effective and active learners in these ways. To improve the usefulness of practice experiences, students might need to be assisted before, during and after these experiences to guide them engage intentionally as learners during these experiences. It was found that just providing practice experiences alone would be insufficient (Billett, 2010a). These experiences needed to be enriched and students needed support and guidance for them to maximise their learning in the circumstances of work.

The didactics of practice

41 In summary, it is advanced that the premises for and foundations of the didactics of practice can be located in conceptions of curriculum, pedagogy and personal epistemology that are in many ways quite distinct from how they are cast with educational institutions. Considerations for the didactics of practice necessarily includes contributions and suggestions coming from the world beyond the individual (i.e. institutional and brute facts) as well as those of individuals (i.e. their cognitive experience) and the relations between these two sets of factors. Fundamentally, it is about what is afforded by the circumstances of work and how individuals engage with what is afforded them. Such processes have been described in Vygotskian inspired socio-cultural theories of learning and development as inter-psychological processes: those between the individual and the world beyond them. As a product of these processes or

interactions, within this paradigm, it is claimed that intra- psychological outcomes arise: changes to what individuals know and organise their knowledge. However, increasingly contemporary accounts whilst supporting this general conception of learning also emphasise the importance of the intra-psychological outcomes not being fixed, but evolving as they are subsequently engaged in the process of ongoing development. Also, Vygotskian-inspired perspectives pays little attention to brute facts such as maturity, ageing, sensory perception, fatigue within persons, and also how these factors shape the kind of activities which individuals engaging and from which legacies (i.e. learning).

42 Two bases for understanding these intra-psychological processes are the activities and interactions in which individuals engage. These are most helpful when aligned with the kinds of knowledge to be learnt. Workers have long reported the effectiveness of learning through observation and listening and practice through engagement in the circumstances of practice (Billett, 2001b). Recent developments in cognitive science have also provided and elaborated bases for the effectiveness of these authentic experiences, as grounded cognition(Barsalou, 2008). It is now held that perception and action are premised upon multimodal processes that work across the various sensory processes and utilising higher ordered means. So, the kinds of representations that are generated by individuals in the circumstances of work appear to be amalgams of sensory inputs of different kinds and are generative of rich simulations that permit effectiveness through their recall.

43 In conclusion, perhaps, the key elements of didactic practice are their co-occurrence with the everyday productive practices in the workplace. Moreover, they emphasise individuals' active learning often to the exclusion of direct guidance or teaching. The latter finds space, however, in the intentional pedagogic practices enacted alongside curriculum and personal epistemological acts that are separate from the everyday requirements of practice. Such are the limitations and short comings to learning approaches alone that it is also necessary to augment them with these kinds of intentional activities. Together, these premises are set out as constituting some tentative bases for the didactics of practice. These kinds of didactic support seem now to be required more than in earlier times as the traditions and worth of learning in the circumstances of work practice are being restored, yet are also faced with challenges brought about by new forms of work, work requirements and ways of working. However, such challenges are worth confronting given the importance of the contributions that the circumstances of work can makes to individuals' learning and the contributions to the occupational practice required by their communities and countries.

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NOTES

1. As a reviewer pointed out the situation was different in France, compared to England and commonwealth countries, because of an earlier and stronger commitment of the State in the field of education. Some vocational schools (for training engineers and high qualified workers) were established from early in the 17th century in France and there were strong debates at the end of the 19th and the beginning of the 20th centuries between partisans: 1) of a public school-based vocational training system; 2) of a private school based systems (based only on employers' immediate needs); and 3) maintaining the existing but dying apprenticeship system.

ABSTRACTS

This paper discusses what constitutes the didactics of practice: learning in the circumstances of work. Learning through practice has and continues to be the principal process through which the occupational capacities upon which human society and individuals depend have been developed. Currently, there is an increased interest in this method of learning for extending experiences in educational programs, sustaining workers' employability across lengthening working lives and assisting the transformation of work and occupational practices. These are important goals for societal purposes, communities, workplace continuity and workers' employability and development. It seems timely, therefore, to outline an explanation of the qualities and characteristics of learning through experiences in practice settings, such as workplaces, and how these experiences can be used and enriched to support effective work-related learning across working lives: the didactics of learning through practice. It is proposed here, that practice-based curriculum and pedagogy, and workers' personal epistemologies are the key framing elements of such didactics. However, these institutional and personal practices are also framed by global, cultural, societal and situated factors that shape individuals' engagement in and their learning through work, and, hence, the didactic qualities and potential of learning through practice. Here, these elements, factors and their consequences are discussed in terms of understanding and enhancing learning experiences in the circumstances of work.

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