4

Developing knowledge through different spaces in work-related settings: insights from the United Kingdom

El desarrollo de conocimientos a través de diferentes espacios en entornos laborales: una visión del Reino Unido

Natasha Kersh*

*   NATASHA KERSH: Researcher, UCL Institute of Education, University College London. Research specialities: international and comparative education, lifelong learning, workplace learning, adult learning, vocational education and training. **Datos de contacto:** E-mail: n.kersh@ucl.ac.uk

Abstract

This article will discuss the notion of spaces as learning contexts and explore how this concept can enhance our understanding of experiential learning in work-related settings. This article aims to consider how employees learn and develop their knowledge through different pathways, and through the different learning spaces in which they are building on their knowledge. The research has demonstrated that employees develop their knowledge through different environments that are often associated with different types of learning spaces: (1) formal learning spaces/academic spaces (which relate to learning through formal courses) and (2) experiential learning spaces (which relate to learning experientially, e.g. from day to day workplace activities). The articles draws on the concept of the learning space as a framework for illustrating the interplay between employees' learning styles and different types of learning environments.

Key Words: Experiential Learning; Workplace Learning; Learning Spaces

Resumen

En este trabajo se discutirá la noción de espacios como contextos de aprendizaje y se explorará cómo puede este concepto mejorar nuestra comprensión del aprendizaje experimental en los entornos laborales. Este artículo tiene por objeto reflexionar sobre cómo los empleados aprenden y desarrollan sus conocimientos a través de diferentes vías y de diferentes espacios de aprendizaje en los que se construye su conocimiento. Las investigaciones han demostrado que los empleados desarrollan sus conocimientos a través de diferentes ambientes que se asocian a menudo con diferentes tipos de espacios de aprendizaje: (1) los espacios de aprendizaje formal / espacios académicos (que se relacionan con el aprendizaje a través de cursos formales) y (2) espacios de aprendizaje experiencial (que se relacionan con el aprendizaje por experiencia, por ejemplo, de actividades del día a día del lugar de trabajo). El artículo se basa en el concepto del espacio de aprendizaje como marco para ilustrar la interacción entre los estilos de aprendizaje de los empleados y los diferentes tipos de ambientes de aprendizaje.

Palabras clave: Aprendizaje Experiencial; Espacios de Aprendizaje; Aprendizaje en el Lugar de Trabajo

1. Introduction: learning spaces and work-related knowledge

The research on social science and education of the past 20 years has brought attention to the concept of space as a learning context that has been socially constructed (e.g. Evans *et al.*, 2006; Kersh *et al.*, 2012; Edwards, *et al.*, 2004 Solomon *et al.*, 2006; Kolb and Kolb, 2005). Issues such as interactions between contexts, spaces, learning and individuals are important dimensions that have contributed to a better understanding of how individuals learn through different spaces and environments.

The learning space as a concept has been subject to various interpretations in the research literature. The learning space could be considered in its different configurations, for example physical space (Temple, 2008), virtual space or informal learning spaces (Kersh *et al.*, 2012; Felstead and Jewson, 2012). Bronfenbrenner's topology (1977) helpfully summarises characteristics of learning spaces that present a combination of both formal and informal learning experiences such as the learner's immediate setting, such as a course or classroom (the microsystem) and other concurrent settings in the person's life such as other courses, or instances of informal learning (mesosystem). This theory, as noted by Kolb and Kolb (2005), provides a useful framework for analysis of the social system factors that influence learners' experiences of their learning spaces. Space as a learning context may provide affordances to the learners that enable them to develop and facilitate their learning. On the other hand, learning spaces may also provide not only affordances but also some potential constraints that may restrict opportunities for learning. Drawing on this framework, this article considers the learning space as a space that is constructed by the learning experiences of individual learners, and, at the same time, constructs their learning experiences in the settings that relate to developing underpinning occupational knowledge. In particular, we consider the following types of the learning spaces where adult learners and employees may develop their occupational knowledge:

1. formal/academic-related learning spaces (such as VET college courses /post-graduate degree programme), and

2. informal learning spaces that are associated with environments where learners/employees acquire knowledge informally: through a range of learning spaces and environments where they learn experientially through drawing on their previous knowledge and experiences and developing it further through a range of activities, tasks and projects. Informal learning spaces, therefore, may represent a combination of elements of various learning spaces, such as those associated with workspaces or previous personal and professional experiences (Kersh, 2015), and may involve crossing boundaries between spaces and contexts (Young *et al.*, 2003).

The link between learning informally/experientially and learning through different spaces has been brought to attention through research in various theoretical traditions and by a range of theoretical approaches, including situated learning (Lave and Wenger 1998), activity theory (Engeström *et al.*, 1995), social ecology (Evans *et al*, 2011) and the theory of knowledge creation (Nonaka and Takeuchi, 1995). The workplace as a learning space that may facilitate personal agency and motivation has also been recognised as a significant

context associated with individual attitudes and aspirations (e.g. Eraut and Hirsh, 2007; Evans 2002; Evans, 2009). Kolb defines experiential learning as 'the process whereby knowledge is created through the transformation of experience from the combination of grasping and transforming experience' (Kolb, 1984: 41). The role of the workplace context and the extent to which it facilitates experiential learning have been further accentuated by a substantial body of research literature (e.g. Edwards *et al.*, 2004; Evans *et al.*, 2006; Malloch *et al.*, 2011), specifically drawing attention to a range of complex interdependencies between individual experiences and learning from everyday working activities and tasks. What employees learn both as novices and experts, in the workplace and in experiences beyond the workplace, contributes to their experiential learning. In addition, their personal workspaces enhance their effectiveness, creativity and social practices within constantly changing contemporary workplaces (Kohlegger *et al.*, 2013).

The workplace as a context for facilitating informal learning provides affordances that may contribute to employee learning opportunities embedded in day-to-day activities (Kersh *et al.*, 2011). Evans *et al.* (2006) make a link between opportunities provided by the workplace and the nature of the environment at work, which offer chances for learning from everyday experiences. Learning in, for and through the workplace (Evans *et al.*, 2006) offers a range of opportunities for exercising individual agency and knowledge development. The related concepts of place, work and learning (Malloch *et al.*, 2011) together constitute the nature of workplace learning, specifically in terms of their structure, meaning and potential utility, that facilitate learning at work through individual engagement (Kersh, 2015).

2. The context of research and methodology

In order to illustrate how knowledge and skills are developed and recognised through and in different spaces, the article will draw on data gathered through 3 projects : 'Enhancing STEM Teaching at Level 3', 'Impact of Poor English and Maths Skills on English Employers' and 'Adult Basic Skills (Skills for Life) in the Workplace project' carried out at the UCL Institute of Education from 2012 to 2016. The article draws on data from 15 qualitative interviews, including 5 interviews with social workers, 4 interviews with Fire and Rescue Service employees and 6 interviews with FE college tutors. The semi-structured interviews aimed to uncover ways in which learners and employees bring together different kinds of knowledge and skills through boundary spaces that emerge from different practices and experiences.

Within this article the following research questions are posed:

- To what extent does the knowledge acquired in different spaces: (1) academic-related/formal, and (2) experiential learning/informal spaces contribute to developing work-related skills and knowledge?

- What is the role played by informal learning spaces and experiences in the development of occupational skills and knowledge?

The next two sections of this article will consider aspects of the development of occupational knowledge in academic-related and informal learning spaces. Both the strengths and the limitations associated with each type of space will be discussed and, furthermore, the following section will look at the experiential learning space, which brings together, contextualises and builds on different types of knowledge acquired from other settings and contexts.

3. Developing occupational knowledge through formal and academic-related learning spaces

Developing occupational knowledge through formal learning spaces relates to acquiring subject-specific theoretical knowledge. Interviews with social workers, FE college tutors and Fire and Rescue service employees indicate that the disciplinary knowledge acquired from accredited degrees is considered to be extremely useful; however, the affordances of the academic-related spaces do not provide opportunities for using this knowledge in relevant practical settings and therefore, in order to be meaningful, it needs be contextualised and/or supplemented with additional research and/or practical activities in the workplace space. Therefore, the development of knowledge in formal learning spaces indicates the following:

- the significance of theoretical/subject-specific knowledge and

- the role played by experiential/informal learning in the workplace in consolidating theoretical and practical knowledge (e.g. contextualised in practical situations within workplace spaces).

The data from the interviews further suggests that learning acquired from formal contexts needs to be contextualised in the requirements of specific workplaces. As noted by a social worker:

"We are learning on the job. Skills and knowledge that I acquired from my qualification are extremely useful, however, the role of a social worker is a challenging one, requiring a range of skills. Of crucial importance are the skills and knowledge required to communicate with children, ... families, this comes with practice. We [social workers] need to be motivated, confident and compassionate." [extract from interview with a social workers].

The significance of theoretical and subject-specific knowledge has also been stressed by a Fire and Rescue Service employees. As was noted, nowadays a firefighter's role is different from what it was 10 or 20 years ago. Firefighters are now expected to be able to deal with a wide range of emergencies, apart from fire, such as flooding, road rescue and terrorism. And this involves acquiring theoretical knowledge and using new skills, including more advanced Maths skills:

"A basic firefighter has to have a certain level of education, and capability of displaying a range of skills. No longer are they just smoke eaters. They are learning new things constantly." [Extract from employer interview: Fire and Rescue Service].

Maths skills that are required for officers, crew commanders and watch managers involve its use for equipment assessment, data analysis and statistics, finance and budgeting. However, as stressed, even in the firefighter job role:

"Being able to read, write and calculate is fundamentally important within the settings of the Fire and Rescue Service. Staff are engaged in continuous workplace learning, from the time they start their employment. Employees need to have good Maths and English skills." [Extract from employer interview: Fire and Rescue Service]"

In the job roles in questions, the need for good Maths skills is essential. The impact of poor Maths skills could result in serious consequences (e.g. health and safety, putting civilians at risk, etc.). Firefighting involves an understanding of what buildings are made of, how fire behaves, how smoke moves and what quantities of water are needed. All those are basic elements that firefighters need to understand:

> "If you can't calculate properly, this means, for example, that you run out of water at a crucial time. Basic English and Maths ensures that all the other technical elements are understood by the staff. A good example is putting foam on a chemical fire – firefighters need to be able to calculate how much is needed for a specific situation." [Extract from employer interview: Fire and Rescue Service].

However, as further noted by a group manager (Fire and Rescue Service), formal theoretical knowledge alone would not provide understanding and skills that could be applied in 'real-life' situations carried out in workplace spaces, and the novice would need to be supported within their new workplaces:

> "The novices come with theoretical knowledge however , they are learning through applying this knowledge in real practical tasks and challenges. Theoretical knowledge, is useful, like, […] maths […] but for many of them it seems to be detached from the real world, until you apply it in your work. They see its usefulness whey they realise few simple things. If you can't calculate properly, this means, for example, that you run out of water at a crucial time. Basic English and Maths ensures that all the other technical elements are understood by the staff. A good example is putting foam on a chemical fire – firefighters need to be able to calculate how much is needed for a specific situation." (Extract from group manager interview, Fire and Rescue Service).

Formal learning spaces provide employees with a theoretical basis in relevant occupational fields, while a valuable in-depth knowledge of the can be acquired only through experiential learning in relevant workplace spaces. Evidence suggests that theoretical and disciplinary knowledge is important and meaningful when it is supplemented by and contextualised within experiential learning/workplace learning spaces. The acquisition and use of disciplinary knowledge provide a sound contribution for the development of work-reated competence and further engagement with experiential learning, specifically through both contextualisation and supplementation of theoretical (disciplinary) knowledge in practice.

Interviews with tutors in the context of further education, similarly indicate that theoretical knowledge needs to be supplemented by practice. Contextualising theoretical knowledge within vocational practice is achieved through demonstrating the relevance of academic knowledge to the real-life workplace context. Theoretical input from the tutors would usually be followed by a discussion and/or illustrations on how this knowledge could be used (contextualised) in the world of work. Visual images, video extracts, workshop simulations and demonstrations as well as hands-on experiences for the students are used to exemplify the relevance and contextualisation of theoretical knowledge within the context of Engineering sector practices. As noted by one of the tutors [Further education, engineering department]:

> "Sometimes they [the learners] have a theory-based teaching session, and then straight after the session they would go to the workshop to see how this theoretical knowledge could be applied in the workshop."

Within specific modules, contextualising vocational knowledge is closely related to incorporating practical skills in the curriculum.

> "At Level 3 the curriculum could be very much theory-based, so we try to put some practical element into our modules' delivery to ensure that the students get hands-on experience in using machines and equipment. [...] We are trying to give them a mix of skills, as most of our students tend to go and work for local industries (e.g. small machine shops). [...] We try to arrange our courses the way that students are learning from both research and experiences rather than just from research." [Curriculum leader, tutor].

Contextualising academic knowledge acquired in formal settings within the context of vocational and work-related practice has been considered as a fundamental principle of occupational knowledge development. Different strategies related to boundary crossing, knowledge transfer and tailoring the provision to the needs of local industries have been employed in order to make the contextualisation meaningful and productive for both learners and employers. The significance of both contextualisation and supplementation of disciplinary knowledge in workplace learning spaces has been highlighted by our respondents. Our interviews with the Fire and Rescue Service employees, indicate that sharpening maths skills for the development of theoretical knowledge is important and meaningful when such skills are embedded in every day workplace activities and practice.

Examples from the social care sector indicated that the respondents have accentuated the significance of contextualising the theory they learned while studying for their degree in practical situations within workplace spaces. The theoretical foundation (e.g. theoretical knowledge acquired through their accredited degrees) provided them with a basis for addressing practical problems, but their theoretical knowledge needed to be contextualised in work-related activities. One of the respondents, a social worker, illustrates this point with the following observation:

> "We come with theoretical knowledge, taught as a part of our formal qualification, [...] theories of psychology, education, management. These theories are meant to help us to understand better human behaviour and relationships between people. But the theory, in my view, needs to be linked to everyday practice, or it becomes meaningless." [extract from interview with a social worker].

As further argued by a college tutor (FE sector) subject-specific knowledge delivery is not simply a mechanical reproduction of various kinds of information and facts in the classroom. As our interviews indicated, subject-specific knowledge becomes meaningful when is embedded in teaching practices. The way subject-specific knowledge is embedded and delivered to learners depends on tutors' teaching approaches and strategies. As noted by one of our respondents:

> "There are a number of different ways you can teach the same discipline, the same topic, the same subject, depending on a particular context. You look at the context, and sometimes your intuition helps you to find the

way to deliver the discipline to the learners. Subject-specific knowledge is re-contextualised when we transfer it to a specific context. Sometimes you need to use different terminology, depending on a context or the groups of learners" [FE college tutor].

Re-contextualisation in this context, also deals with how the subject specifications and generic teaching standards are selected in terms of what to teach, the order in which they are taught, the time that is required to cover the curriculum, and how the different parts of the subject specifications are related to each other and to generic teaching standards. Also, the past knowledge and experience of trainees need to be considered in the teaching process (Loo, 2006: 466).

4. Embedding learning from previous experiences in the workplace

As Pye (1994) suggests, recontextualisation draws on one's biography of experience, which is fluid, embracing past and future possibilities. Both our empirical and theoretical research emphasised the importance of employees individual experiences and biographies in the development of their work-related skills and knowledge. The significance of individual biographies, experiences and dispositions in the workplace and, in particular, in teaching practices, has been stressed by Hodkinson *et al* (2006). They identify overlapping and inter-linked ways in which biography is relevant to learning at work, specifically emphasising dimensions such as workers/learners' prior knowledge, which can contribute to their future work and learning; the habitus of workers, including their dispositions towards work; the values and dispositions of individual workers and working and belonging to a workplace community. As demonstrated by Evans *et al* (2004) research, while the considerable learning which takes place in the workplace has been increasingly recognised, learning also results from a range of life experiences, in home and family settings, engaging in volunteer activities, and overcoming various setbacks in life. Our interview data has shown that employees' prior experiences play a significant part in developing their teaching practices:

> "My previous work and life experiences have greatly influenced me in the way I deal with [challenges of the teaching profession]. I have had jobs in a variety of different employments in Australia, the US and UK in both large and small companies, plus I studied for several years to qualify in Homeopathy and Reflexology as well as gaining more conventional academic qualifications and it is clear to me that both management of staff or management of students has many parallels. The best managers and teachers I have had have been the approachable easy-mannered ones, those confident enough in their own world to either delegate work without strings attached or calm and patient enough to talk things through" [FE college tutor].

The acquisition of these skills is often tacit in nature and thus individuals do not necessarily recognise to what extent they use their previously acquired skills in their teaching practices or draw on their learning biographies in developing new strategies and approaches to be used in college contexts. However, our research has indicated that

these skills have proved to be very important for the development of teaching practice in a college context. Various dimensions of the tutors' previous experiences as well as their previously acquired skills are recontextualised in their current workplace context. In this context, recontextualisation of the tutors' previous experiences/skills could be either tacit or explicit. Building on the work of Merriam and Clark (1993), Loo (2008) points out that most life-changing experiences are informal, such as parenting, travel, balancing work and personal life, death in a family, living abroad, and the break-up of a serious relationship. He found that life experience learning was significant in two ways. The first affected the individual, which resulted in an expansion of skills, abilities or self-awareness, or the experience transformed the person. The second finding involved the value placed by the individual, which might create a "personal stamp" on the experience and was viewed as of importance in the individual's life. Our interviews support the argument that tutors draw on their personal experiences and previously acquired skills when they undertake various teaching activities in college contexts. Their skills, knowledge and experiences are recontextualised in their new settings:

> "I began teaching Art in 1993, then IT in 1994, at which time there were very few suitable materials available for the subjects that I was teaching. I taught mainly foreign students who were here to learn English and computer skills became part of their timetable. With no examples to refer to I devised training materials entirely based on my own personal work experiences. In hindsight these materials were at best adequate; however, they improved as my academic experience grew. I learned heavily from my mistakes" [FE college tutor].

Skills and experiences are being further recontextualised in order to respond to changing workplace requirements and be better embedded in the everyday workplace practice:

> "Today, however, I have changed the way I teach in response to the different students I now encounter. Previously they were foreign students who had high levels of capability and they also expected a more traditional lecture-centred delivery. Now I teach mostly local and younger students who initially at least seem to need more parenting and role modelling as well as academic training. There may be several factors at work here in that these students come with higher levels of IT skills having grown up with this technology as a key part of their lives, yet their academic skills are generally very poor. The focus for these students appears to be more on their basic communication and social interaction skills so the traditional lecture-centred teaching system is not always the most appropriate method. The original simple system of materials delivery I used, based heavily on my previous work experience, has changed significantly due principally to my academic experience" [FE college tutor].

This indicates that the workplace environment fundamentally affect how skills and knowledge are put to work (Evans and Guile, 2012). Hodkinson *et al.* work (2006) illustrated the importance of the influence of prior activity on current activity and the different ways in which actors may construe situations as being 'similar'. In this context, various work-related processes involve responding to affordances and constraints of the workplace. In addition, workplace environments enable individuals to learn and acquire new skills and experiences, which are then contextualised within the same environment or different environment or context.

5. The role and significance of the workplace learning space

The findings support the view that in order to develop and demonstrate knowledge that enables employees to develop their occupational knowledge, all types of knowledge need to be contextualised within workplace spaces through practical, experiential and informal learning. This applies to both knowledge developed through formal learning spaces and that developed through less conventional learning spaces, such as experiential and informal learning spaces. The affordances of workplace learning spaces allow for different types of knowledge to be contextualised and applied in specific activities and projects.

The workplace learning space that provides affordance for experiential learning is perceived as a space where knowledge becomes meaningful once it's embedded and contextualised in specific activities. These affordances of the workplace are related to the notions of *learning in, for and through the workplace (Evans et al, 2006)* . Learning is here perceived as something that "you do continually whilst at work, both out of choice and by necessity" (Gray *et al.* 2004). Similarly, "most of what we learn takes place at work rather than on formal courses. Work activities, the workplace, the supervisor, other workers ... are the key learning resources for workers" (Malone: 2005: 67). What employees learn as learners-in-the-workplace leads to the development of certain skills or competences, which may be job-specific, occupational or personal development related.

Recontextualisation of such skills and competences is important in this context. Even if employees' work-related skills have been acquired within the setting of their current workplace, the skills often need to be embedded and recontextualised within the same workplace, but within different contexts of the same workplace. Examples form our data include, for example, acquiring skills through participation in a range of CPD (FE Continuing Professional Development) sessions, and then embedding and recontextualising these skills in real teaching practices.

Our respondents reported that in order to be deployed and utilised, such newly acquired job-related skills, knowledge and experiences need to be recontextualised, or in other words, properly embedded, in the work with learners, for example, in classroom activities (for FE tutors) or in Fire and Rescue tasks and assignments (for Fire and Rescue employees) . Transferring skills and knowledge from one space (context) to another is neither straightforward, nor simple. It depends on many factors, such as employees' attitudes and dispositions, regulatory frameworks and the structural organisation of their workplace environment as well as workplace constraints or opportunities.

Our research has indicated that the process of recontextualisation can be facilitated by employee positive attitudes towards learning in the workplace. Their skills and knowledge need to be continuously recontextualised in their workplace environments, as the environments themselves are in a process of constant transformation. The factors that contribute to this transformation include new/changing learners' requirements; changing government policies, internal changes in the workplace, etc. All these changes require employees to adapt their skills and knowledge to the changing demands of workplace environments. Thus, their knowledge needs to be recontextualised and embedded in their current practices.

Fuller and Unwin's (2004) typology of expansive and restrictive workplace environments suggests that workplace environments *experienced as* expansive facilitate

further development, deployment and embedding of skills whereas environments *experienced as* restrictive are found in workplace settings that do little to encourage further professional training or development of new skills. Restrictive working environments are also connected with isolation at work when employees have a feeling that they are outsiders or mere observers. Conversely, as the authors observe, expansive workplace settings are often associated with the feeling of being a part of a team at a workplace. Our research findings support the argument that environments experienced as expansive facilitate the meaningful recontextualisation of tutors' skills and experiences. Therefore, affordances of the learning space, influenced by either expansive of restrictive environments, play a crucial role in facilitating or undermining learning in the workplace. Through engaging in various configurations of their workplace practices, employees use and recontextualise their skills. What is more, as a result of the recontextualisation of their previous experiences and knowledge, new knowledge or new types of skills may be constructed and developed. Another important factor is that of the influence of the workplace environment. Novices entering a new workplace may experience their working environment as expanding, and this would also facilitate further embedding and recontextualisation of their skills. Environments that are experienced as giving recognition to and supporting deployment of their tacit, as well as explicit, skills (expansive environments) assist in further development.

6. Conclusion

In this article we considered the extent to which learning through different spaces contributes to developing work-related skills and knowledge. The findings support the view that both types of knowledge i.e. formal (subject-specific) and informal (experiential) make a significant contribution towards developing occupational knowledge and competences.. However, all types of knowledge need to be contextualised in relevant work-related activities through experiential learning. Different configurations of the learning space at work facilitate knowledge development through work-related spaces and environments, specifically through providing opportunities and affordances for the development of personal skills, motivation and outcomes. Crossing boundaries across academic-related spaces and workplace-related spaces enables employees to navigate these spaces while developing their knowledge through contextualising theory into practice and vice versa. The findings underpin the significance of workplace learning spaces as a context that provides affordances for developing occupational knowledge, including both knowledge developed through formal learning and that developed through less conventional informal learning spaces. The significance of experiential learning, as a configuration of the learning space at work, has strongly emphasised the value of practical learning and learning through the practical application of theoretical knowledge, where motivation, self-learning and learning from colleagues play a crucial role. The interpretation of interview responses indicates that employees learn continuously on the job through workplace activities, tasks and responsibilities. An accredited qualification and related subject-specific knowledge are important for the development of occupational knowledge. However, as the respondents indicated, the knowledge gained through formal learning needs to be contextualised into practical workplace contexts. Workplace spaces provide valuable opportunities for both practical and theoretical learning; which requires a high level of personal involvement, motivation

and mentor/employer support in the workplace. Furthermore, learning experientially through workplace activities, where theory and practice come together, contributes to the development of work-related knowledge Developing effective knowledge through the workplace depends on a range of factors and preconditions, such as professional support, individual responsibility and, what was cited as a very important factor, opportunities to engage in projects that enable one to build on existing knowledge and acquire new knowledge through practical application and activities. The perception of knowledge development that relates to the process re-contextualisation has been emphasised by the interviews. Such a process involves employees building on their current knowledge, and continuously developing their underpinning knowledge further within and through practical workplace contexts.

7. References

BROOKS, R *et al.*, eds (2012): *Changing Spaces of Education: New Perspectives on the Nature of Learning* (London: Routledge).

BOUD, D. & GARRICK J. (1999): Understanding of workplace learning, in D BOUD AND AND J GARRICK (eds), *Understanding Learning at Work* , pp. 29–44 (London: Routledge)

BRONFENBRENNER, U. (1977): Toward an experimental ecology of human development, *American Psychologist,* 32, 7, pp. 513–531.

BURROUGH, P., A. (1996): Natural objects with indeterminate boundaries, in P.A BURROUGH & A.U FRANK (eds), *Geographic Objects with Indeterminate Boundaries*, pp. 3-28 (London: Taylor and Francis)

EDWARDS, R., GALLAGHER, J. & WHITTAKER, S. eds (2004): *Learning Outside the Academy: International research perspectives on lifelong learning* (London: Routledge).

ENGESTRÖM, Y., ENGESTRÖM, R. & KARKKAINEN, M. (1995) Polycontextualityand boundary crossing in expert cognition: Learning and problem solving in complex work activities, *Learning and Instruction*, 5, 4, pp. 319–336.

ENGESTRÖM, Y., ed. (2001): *Activity Theory and Social Capital* (Helsinki: Centre for Activity Theory and Developmental Work Research).

ERAUT, M. (2004): Informal learning in the workplace, *Studies in Continuing Education,* 26, 2, pp. 247–73.

ERAUT, M. & HIRSH, W. (2007): The Significance of Workplace Learning for Individuals, Groups and Organisations (SKOPE) (http://www.skope.ox.ac.uk/publications/ significance-workplace-learningindividuals-groups and-organisations).

EVANS, K., HODKINSON, P., RAINBIRD, H., & UNWIN, L. (2006): *Improving Workplace Learning*, (New York: Routledge).

EVANS, K. & GUILE, D. (2012): Putting different forms of knowledge to work in practice, in J HIGGS *et al.* (eds), *Practice-Based Education: Perspectives and Strategies*, pp. 113–30 (Rotterdam: Sense Publishers).

EVANS, K., KERSH, N., & SAKAMOTO, A. (2004): Learner biographies: Exploring tacit dimensions of knowledge and skills, in H. RAINBIRD, A. FULLER, & A. MUNRO (Eds.), *Workplace Learning in Context*, pp. 222–241 (London & New York: Routledge).

EVANS, K. (2002): The challenges of "making learning visible, in K. EVANS, *et al.* (Eds.), *Working to Learn: Transforming Learning in the Workplace*, pp. 77–92 (London: Kogan Page).

EVANS, K. (2009): *Learning, Work and Social Responsibility* (Springer: Dordrecht)

FELSTEAD, A . & JEWSON, N. (2012): New places of work, new spaces of learning, in BROOKS *et al.* (eds): *Changing Spaces of Education: New Perspectives on the Nature of Learning*, pp. 137–58 (London: Routledge).

FULLER, A & UNWIN, L. (2004): Expansive learning environments: integrating organizational And personal developments, in H. RAINBIRD, A. FULLER & MUNRO, A. (eds.), *Workplace Learning in Context, pp. 126-14[...]* (London: Routledge).

HODKINSON, P., HODKINSON, H., EVANS, K., & KERSH, N., WITH FULLER, A., UNWIN, L., & SENKER, P. (2004): The significance of individual biography in workplace learning, *Studies in the Education of Adults*, 36, 1, pp. 6–24.

KERSH, N. (2015) Rethinking the learning space at work and beyond: The achievement of agency across the boundaries of work-related spaces and environments, *International Review of Education*, 61, 6, pp. 835-851.

KERSH, N., EVANS, K., KONTIAINEN, S. & BAIEY, H. (2011): Use of conceptual models in self-evaluation of personal competences in learning and in planning for change, *International Journal of Training and Development,* 15, 4, pp. 290–305.

KERSH, N., EVANS, K & WAITE, E. (2012): The spatial dimensions of workplace learning: acquiring literacy and numeracy skills within the workplace, in R. BROOKS *et al.* (eds), *Changing Spaces of Education: New Perspectives on the Nature of Learning*, pp. 182-204 (London: Routledge).

KOHLEGGER, M., MAIER, R., & REMUS, U. (2013): *Freedom of Choice: Perspectives on Personal Workplace* (ECIS Proceedings).

KOLB, D. A. (1984): *Experiential learning. Englewood Cliffs* (NJ: Prentice Hall).

KOLB, A. & KOLB, D. (2005): Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4, 2, pp. 193–212 (Lave & Wenger).

LAVE, J. & WENGER, E. (1998): *Communities of practice: Learning, meaning, and identity,* (Cambridge: Cambridge University Press).

LOO, S. (2006): Adult numeracy teacher training programmes in England: a suggested typology, *International Journal of Lifelong Education*, 25, 5, pp. 463—476.

MALLOCH, M., CAIRNS. L., EVANS, K. & O'CONNOR, B, eds (2011): *The Sage Handbook of Workplace Learning* (London: Sage).

NONAKA, I. & TAKEUCHI, H. (1995): *The Knowledge Creating Company* (New York: Oxford University Press).

PYE, A. (1994): *Management Learning*, 25, 1 (Sage).

SOLOMON, N., BOUD, D. & ROONEY, D. (2006): The in-between: exposing everyday learning at work. *International Journal of Lifelong Education* 25, 1, pp. 3–13.

TEMPLE, P. (2008): Learning spaces in higher education: an under-researched topic, *London Review of Education,* 6, 3, pp. 229–41.

YOUNG, M., TUOMI-GRÖHN, T. & ENGESTRÖM, Y. (2003): From transfer to boundary-crossing between school and work as a tool for developing vocational education: an introduction, in T. TUOMI-GRÖHN AND Y. ENGESTRÖM (eds), *Between School and Work: New Perspectives on Transfer and Boundary Crossing,* pp. 1-19 (Oxford: Pergamon -Elsevier Science-).