
Investigating what constitutes an effective workplace learning environment: A scoping review of the role physical and material elements play in student learning

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Abstract

The purpose of this article is to report on a scoping review of the literature on workplace learning in order to understand what is known about the impact the physical material dimensions of workplace learning environments have on enhancing students' learning. The experience of workplace learning in authentic workplace settings is perceived as invaluable for undergraduates as a preparation for professional practice. With growing participation rates, there is an increased demand for universities to offer work placements. Although universities have no direct control over workplace environments, they can be astute in selecting workplaces that offer effective workplace learning environments for students. In order to undertake this selection it is important to understand what key features of workplace learning environments enable students to learn effectively. Using Arksey and O'Malley's five step scoping review strategy, the researchers found that the physical material dimensions of the workplace learning environment and their influences on student learning have to date been neglected. The researchers also found that conceptualisations of workplace learning environments were often limited to a common sense understanding of the term environment. What constituted an effective workplace learning environment was mostly defined in relational terms through the quality of interaction between student and supervisor neglecting the physical material potential of workplace learning environments for learning. The researchers draw some implications for university capacity to select appropriate sites for student placements and make some recommendations for further research.

Keywords: learning environments; learning space, placements, professional education, workplace learning

With global trends of increased participation rates in university education and the need to prepare students for the world of work, there is an increased demand for workplace experiences (Coll & Zegward, 2011). There is a concern that scarcity of work placements could force universities to accept placing students in workplace learning environments (WPLE) that are of low quality or even unsafe. It is therefore important to make the most efficient and effective use of available WPLE.

Authentic experiences in the workplace make an invaluable contribution to preparing students for work (Higgs, Barnett, Billett, Hutchings, & Trede, 2012) and cannot be replaced altogether by simulations, project work, role-play, or other non in situ activities of practice-based education. Key differences between academic classroom, virtual settings, and workplace environments are that in the latter students are exposed to and/or immersed in the socio-cultural, physical, and material dimensions of work. Rather than just focusing on the student-supervisor relationship, the workplace exposes students to its specific organisational hierarchies and culture, professional conducts, artefacts and materials, as well as to notions of professional responsibilities and consequences of actions.

There is a vast literature that conceptualises WPLE as interdependently influenced by socio-cultural, physical, and material dimensions. This literature mostly draws on Vygotsky's zone of proximal development concept to theorise about the ways in which people interact with these dimensions as manifested in organisational structures (Engeström, 2001) and people's positions within communities of practices (Lave & Wenger, 1991) or functions and levels of expertise (Billett, 2001). Within this body of literature, there remains a strong focus on the student-supervisor (subject-subject) relationship, although the role physical places and material artefacts, including their invitational qualities, play in students' learning (subject-object) to explore and develop their practice knowledge and skills is examined (Billett, 2010; Fenwick, Nerland, & Jensen, 2012; Nerland & Jensen, 2010).

Focusing on the physical and material dimensions of WPLE and their role in enhancing students' learning is not an easy task when the effect a WPLE has on learning is complex and not well understood. It is, nonetheless, essential for academics, workplace learning supervisors and students to understand what constitutes an effective WPLE if universities are to ensure that students can make the most of knowledge sources in the workplace, beyond the student-supervisor relationship (Jensen, Lahn, & Nerland, 2012).

From experience, the researchers have found that although the physical and material dimensions of the WPLE and their scope to enhance student learning are mentioned in university workplace learning programs, however, their integration and potential influence on student learning has mostly been neglected or overlooked. The researchers were, however, interested in finding out what is known in the literature of practice-based education and workplace learning about the role the physical and material dimensions of workplace environments play in enhancing or hindering students' learning. The purpose

of this scoping review was, therefore, to identify peer-reviewed articles that contribute to the debate about the theoretical underpinnings of workplace learning, with a particular focus on the physical and material dimensions of the workplace as a learning space to enhance student learning and work-readiness.

Method

This study adopted a scoping review method to identify, map, and summarise what is known in the pertinent literature about what constitutes an effective WPLE to enhance student learning while they are on placement, with a special focus on physical material dimensions. Unlike systematic reviews that have a strong focus on assessing quality, a scoping review allows for capturing and analysing different study approaches. The scoping review methodology used was Arksey and O'Malley's (2005) five-step strategy. The five steps are: identifying the research question; identifying relevant studies; study selection; charting the data; and collating, summarising, and reporting results.

The study's research question was developed with the aim of capturing breadth and different methodological approaches (Arksey & O'Malley, 2005) to exploring physical material dimensions of effective WPLE. The research question was: What is known in the pertinent literature about what constitutes an effective WPLE that can support and enhance student learning while they are on placement? The researchers did not reduce the search to physical material dimensions, because the intention was to explore how these dimensions were integrated into concepts of WPLE.

As the second step, relevant articles were identified. As there is no global terminology for WPLE, an understanding of WPLE was articulated around six core terms: workplace, experience, student, effective, higher education, and environment. From this list of terms, the following clusters of search terms were defined:

1. Workplace, Work;
2. Experience, Field, Internship, Placement, Training, Learning;
3. Student, Undergraduate, Recruit, Trainee;
4. Effective, Good, Positive, Quality;
5. Higher Education, University; and
6. Environment, Practice.

This list was used to conduct a series of Boolean searches where *or* was used as a relating denominator within a cluster (e.g. Workplace OR Work) *and* was used to relate each cluster (e.g. Work *and* Environment).

In order to embrace the breadth of different approaches and academic disciplines and occupational fields 20 search engines were used to locate relevant articles. The databases searched included ALTC, CSU Library catalogue, DEhub, EBSCO, EdITLib, ERIC, Expanded Academic ASAP, Google scholar, Informit, Ingenta Connect, LSAY, Medline, NCVER, Ovid, Project MUSE, Proquest, VOCED.

The third step was to establish the boundaries of the search to ensure articles pertinent to the research question were retrieved. For this purpose, a list of inclusion and exclusion criteria was developed to refine the search (see Table 1).

Table 1.
Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Time	January 1991 to December 2011	Any articles outside of this timeframe
Type of article	Original peer-reviewed articles published in a journal	Books, book chapters, reports, unpublished work (e.g. PhD thesis)
Language	English	Non-English
Study focus	WPLE obstacles or enablers to students' learning.	Teaching strategies, evaluation of learning and teaching, benefits of workplace learning, types of learning in the workplace or the range of workplace learning activities.
Setting	University professional entry courses.	Employees, staff

The initial search produced 188 articles. After reviewing abstracts against the inclusion and exclusion criteria, these were culled to 76. The 76 articles' abstracts and keywords lists was reviewed by the research team to rank them as high (exact match to search terms and inclusion and exclusion criteria), medium (all but one or two clusters of terms and inclusion and exclusion criteria) and low (the remaining articles) in relation to the way in which they addressed the study's research question and matched the inclusion and exclusion criteria. This resulted in 16 articles being found to be addressing the scoping review's question, matching the search terms and inclusion and exclusion criteria.

For the fourth step of the scoping review strategy, data was charted from the article set by providing information about the following WPLE related issues: practice tradition, socialisation, quality of activities, quality of learning outcomes, WPLE, private versus public settings, rural and remote settings, range of activities, and quality of interactions. The ways in which each article addresses or does not address these issues are outlined in Table 2.

Table 2.

Information from the Identified Articles

Article	Occupational setting	Research design	Theoretical framework	Recommendation for future research
Ashton, (2004)	Engineering	Empirical	Draws on Koike and Darrah's work with a focus on organisational structure's and culture's impact on learning processes	"What are the implications of changes in the structure of organisations for the process of learning?" (p. 52).
Deketelaere, Kelchtermans, Struyf, & De Leyn, (2006)	General medicine	Empirical	Elements of action research using a conceptual model about the "components that constitute the experience of learning during clinical internship" (p. 40)	"More large-scale research should be carried out to further corroborate the model, and to analyse the different configurations in which the components and tensions constitute practical learning experiences."
Ellström, Ekholm, & Ellström, (2008).	Care work	Empirical	Draws on Billett (2001), Ellström (1997, 2001) and Fuller and Unwin's (2004) notions of informal learning in the workplace. As well as Dymock (2003) and Watkins and Marsick's (2003) notions of learning culture	None
Engeström, (2001).	Paediatrics	Conceptual and empirical	Theory of expansive learning, based on Vygotsky's cultural-historical activity theory framework	None
Fuller, & Unwin, (2003).	Steel industry	Empirical	Community of practice and activity theories	None
Kirke, Layton, & Sim, (2007).	Occupational Therapy	Empirical	Not stated	None
Konkola, Tuomi-Grohn, Lambert, Ludvigsen, (2007)	Occupational Therapy	Empirical	Activity theory	Longitudinal studies that describe and analyse how different activity systems interact and create possibilities for developmental transfer
Lyon, (2004).	Medicine	Empirical	Symbolic interaction theory Community of Practice	An examination of the usefulness of the model in other settings that are dynamic and multidimensional
McMahon, & Quinn, (1995).	Hospitality industry	Opinion piece	Not stated	None
O'Toole, (2001)	Funeral services	Empirical	Not stated	None
Papp, Markkanen, & von Bonsdorff, (2003).	Nursing	Empirical	Phenomenology	None
Pollard, (2008).	Health and social care	Empirical	Not stated	None
Powell, (2001).	Engineering	Empirical	Not stated	A cost-benefit analysis of placements
Price, Mifflin, Mudge, & Jackson, (1994).	Rural medical education	Empirical	Adult learning theory by Knowles and Candy	None
Robinson, Andrews-Hall, & Fassett, (2007).	Aged care nursing	Empirical	Not stated	None
Sato, (2003).	Police	Conceptual	Organisational theory network theory	None

For the final step in Arksey and O'Malley's framework, the final set of articles were summarised and interpreted according to the following questions that centred on definitions and conceptualisations of WPLE:

1. Do the articles offer a definition for WPLE?
2. What theoretical framework (or theory) does the article draw on?
3. What does the article contribute to integrating a physical material dimension into the understanding of what an effective WPLE is?

Results and Findings

The majority of the articles from the final set were published in health and education journals (seven in health journals and eight in higher education/training journals). The one exception was an article published in a policing journal. Of the eight education journals, only two articles were published in the same journal, (the *Journal of Education and Work*). The final literature set was located within four different academic disciplines: education, psychology, architecture, and management. This literature drew on case studies conducted in the UK, Europe, Scandinavia, Australia, and New Zealand. The range of occupational disciplines included nursing (Papp, Markkanen, & von Bonsdorff, 2003; Robinson et al., 2007), medicine (Deketelaere, Kelchtermans, Struyf, & De Leyn, 2006; Lyon, 2004; Price, Mifflin, Mudge & Jackson, 1994), care work (Ellström, Ekholm, & Ellström, 2008), paediatrics (Engeström, 2001), occupational therapy (Kirke, Layton, & Sim, 2007), health professions (Pollard, 2008), funeral services (O'Toole, 2001), engineering (Fuller & Unwin, 2003; Powell, 2001), steel processes, business, administration, and accounting (Fuller & Unwin, 2003), hospitality industry (McMahon & Quinn, 1995) and police (Sato, 2003).

None of the literature reviewed explored the complex interdependent socio-material, physical, and cultural dimensions that together make up the WPLE. Rather, authors paid closer attention to some selected elements within a WPLE in relation to their chosen research focus in supporting student learning outcomes or in relation to the ways in which it addressed particular issues of a given profession. Most articles focused on profession-specific issues of WPLE. For example, Price et al. (1994) focused on increasing medical practice in rural settings, while Robinson, Andrews-Hall, and Fassett (2007) focused on nursing students in aged care facilities.

Although all articles acknowledged the WPLE to be an important dimension that influences learning in the workplace, they rarely included conceptual frameworks to articulate what constitutes a WPLE and an effective workplace learning experience. Most of the selected articles affirmed the importance of a *good* WPLE without either problematising or theorising the concept. Furthermore, no authors made recommendations for future research into WPLE. Instead most offered supervision specific recommendations for improving workplace mentoring, supervision, or assessment by providing checklists about how the placements should be organised by the academic institution.

Definitions for WPLE. Within the set of articles, there was a dearth of explicit definitions of what constitutes an environment. Most authors argued that good learning environments were important, but often used as *common sense* understanding of WPLE, that mostly remained taken-for-granted and with a latent understanding that effective WPLE embrace physical and material dimensions and their arrangements within the organisation, as the following examples illustrate.

Papp et al. (2003) equated the clinical environment with the WPLE and listed its various elements: “The clinical environment encompasses all that surrounds the student nurse, including the clinical settings, the equipment, the staff, the patients, the nurse mentor, the nurse teacher” (p. 263). The clinical environment was described as hard to control with no further explanation as to why or description of the critical environmental features.

Ashton (2004) provided more detail when he discussed the delicate reciprocal relationship between organisational constraints and students’ motivation to learn. Though he acknowledged the importance of students’ own motivation in learning, he placed responsibility of *good* WPLE on student exposure to learning new skills:

[T]he individual’s motivation to engage in the process of learning is seen as determined by their previous experiences, but these interact with organisational constraints in four main areas: in the extent to which the organisation facilitates access to knowledge and information; in the opportunity it provides to practice and develop new skills; in the provision of effective support for the learning process and in the extent to which it rewards learning. (p. 45)

O’Toole (2001) also made a strong argument for the interconnection between the physical and cultural environments and students’ intention to learn. She stated that the physical environments of a workplace are “manifestations of culture” (p. 12) and asserted that “people create the physical environment around them, so influence the environment, but the environment in turn influences people” (p. 11).

Ellström et al. (2008) defined learning environments as conditions and practices that shape learning. More specifically, they wrote that “In practice, we assume that a certain learning environment may include conditions that are enabling for learning as well as conditions that may constrain learning. Thus, in practice many learning environments are presumably of a mixed type” (p. 86).

Lyon (2004) explored the operating theatre as a WPLE and described it as a “confronting, unpredictable and disorientating place for the medical student as learner, and a challenging place in which to teach” (p. 1280). She also stressed the intersubjective complexity of the WPLE by stating that “Surgeons and teachers in their actions together constitute a learning environment” (p. 1285).

Theoretical frameworks for WPLE. According to our article set the most prominent theoretical framework used to analyse WPLE was activity theory (Ashton, 2004; Engeström, 2001; Fuller & Unwin, 2003; Konkola, et al. 2007; Sato, 2007). Activity theory proponents that have applied this approach to learning in the workplace (Engeström, 2001; also see Fenwick & Edwards, 2010; Fenwick et al., 2012) asserted that to learn people interact, directly and indirectly with people in the workplace, and that learning is mediated through objects and signs. For example, by focusing on who, what, why, and when do subjects learn, Engeström (2001) discussed the role of objects and how subjects engage with them.

Though these scholars are concerned with the workplace as a socio-material environment, their learning focus remains on the *what* (learning outcomes) rather than on the *how* (the relationship between learners and the material world). Billett (2001) defined the social and physical environment of the workplace as including “interactions with other workers, observing and listening to other workers, objects and artefacts” (p. 35). These interactions are dependent on the ability to interpret objects and their not yet fulfilled potential. Diverse engagements with material and physical dimensions of WPLE build a repertoire of workplace learning experiences. The scope of this repertoire depends on the interpretations that the student and workplace supervisor make in *sizing up* the WPLE they are operating within (Lyon, 2004).

Within this framework, the physical and material environments (the tools, signs, and physical layouts, etc.) are understood as mediating elements for learning in the workplace. A point in case is Fuller and Unwin’s (2003) second type of learning opportunities in their conceptualisation of expansive learning environments. The first type of opportunities were around “engaging in multiple and overlapping communities of practice at and beyond the workplace,” the second were around “access to a multidimensional approach to the acquisition of expertise through the organisation of work and job design” and the third were around pursuing “knowledge based courses and qualifications relating to work” (p. 149).

Understanding effective WPLE. The oldest paper included in this study (Price et al., 1994, p. 244) added to the understanding of effective WPLE a discussion of the various workplace settings in health and related activities that are performed in each of them. They argued that each setting, such as ward rounds, patients’ homes, lunch rooms, and operation theatres, invites different professional activities and, thus, offers students different engagements with learning.

In line with Price et al. (1994), O’Toole (2001) noted “organizational members draw messages from their environment that supports their learning” (p. 10). Moreover, O’Toole argued that the interpretative and subjective perspectives that learners bring to participating in the workplace influence their ability to interpret physical workplace environments, how they shape the physical environment around them, and the effect the physical environment has on them. Further, by bringing together learning and architec-

tural theories about social and physical place/space, O'Toole argued that "the physical surroundings of an organization such as the building, layout, machinery, equipment, and uniforms may have a significant impact on the way people work and therefore the way they learn" (p.10). With her concept of *place identity* O'Toole stated that certain places at work are used to create different spaces that enable or constrain different types of teaching and learning as well as shape people's roles and tasks.

Another way of understanding effective WPLE was by focusing on the elements within workplace environments that enable learning. Ellström et al. (2008), and Fuller and Unwin (2003) understood an *enabling* learning environment as the outcome of a dynamic interplay between user demands, work content, the educational background of the care workers, their task orientation, management support, and learning readiness. "The complex interplay between these factors appears to have the character of a virtuous circle, where the different factors reinforce each other positively" (Ellström et al., 2008, p. 95). Fuller and Unwin (2003) distinguished between objective-structural and subjective aspects of WPLE, asserting that although structural aspects hinder or enable learning, it is learners and their subjective engagement with structural aspects that enables learning. Writing from a police training perspective, Sato (2003) found that a commitment to ethical practice within an organisation greatly enhanced effective WPLE.

Other authors have focused on the elements within WPLE that negatively impact on students' learning. Robinson et al. (2007) examined the levels of stress in staff and how these impacted on students' learning. Pollard (2008) emphasised the importance organisational systems had on students' and staff's learning. Powell (2001) explored how market driven policies impact on the education system and in particular how they shaped WPLE.

Discussion and Conclusion

The reviewed literature highlights a number of interactive dimensions that are constitutive of an effective WPLE. Affirming the findings from the article set, the researchers propose that an effective WPLE is determined by three dimensions and the quality of the interactions between them: individual participation; educational activities and scaffolded arrangements (e.g. orientation, supervision, feedback and assessment); and the socio-cultural, physical, and material environment of work.

It is the third of these dimensions, and more specifically the physical and material dimensions of WPLE, that has been given less attention. The researchers found that most articles in this scoping review placed more emphasis on people than on material, objective, physical, and organisational aspects of the WPLE. There was little discussion of developing effective WPLE by tailoring them to address students' learning needs, but rather students needing initiative to engage with what they found on a relational level. Also, the notion of reciprocity between students and WPLE was an aspect that was not explored. Indeed, whether focusing on the physical or material enablers or the obstacles

to learning in WPLE, most authors argued that effective WPLE relied on the learner and/or the teacher/facilitator's capacity to make sense of WPLE and seize opportunities whether intentionally designed as learning activities or not. For example, McMahon and Quinn (1995) discussed the responsibility of universities to alert students to the diversity of work settings in their chosen industry and raise their awareness to particular possibilities that a placement can offer. Ashton (2004) acknowledged the importance of students' motivation to learn, but placed responsibility of good WPLE on the invitational qualities of the organisational structure and culture. Kirke et al. (2007) placed responsibility for *good* WPLE with the supervisors within the host organisation to provide scaffolded orientations, and give constructive feedback that would allow students to learn.

In the search for effective WPLE academics need to work with a conceptual model or a framework that allows them to identify not only the essential components of effective WPLE in relation to individual participation and educational arrangements, but also in relation to the physical and material dimensions. Including these latter dimensions will allow them to better prepare students to engage with the full potential of a WPLE.

Deep learning rarely happens spontaneously within the workplace. It requires intention, design and promotion at organisational as well as at individual levels (Ellström et al., 2008). Further, within workplaces there are many different places that invite different modes of learning and for different types of knowledge and skills. Identifying the range of opportunities these places offer can be beneficial when placing students. For example, beyond the narrow professional technical skills and knowledge, palliative care settings can provide an invaluable opportunity for students to learn about ethical and emphatic dimensions of medical practice; and a court room can foster learning about ritual and rhetoric dimensions of law practice.

Further research on WPLE needs to focus on developing a better understanding of the physical and material environment of workplaces as a space not only shaped for work, but also as a space that shapes learning for work. This can be addressed by bringing research in sociology, cultural studies, and human geography that explore concepts of space and place, including a special mention for digital spaces, to help theorise about students' learning in the workplace. A better understanding of the invitational learning qualities of the physical and material dimensions of WPLE will enable students and teachers to engage more deliberately with their full potential. It could also assist educators in selecting suitable environments for placements and provide accreditation bodies with an evidence base for monitoring the quality of placements.

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