Learning through Work and Structured Learning and Development Systems in Complex Adaptive Organisations: Ongoing Disconnections

A. L. Lizier and A. Reich

Decades of research on workplace learning has reinforced that professionals learn through work; however, organisational learning practices have often not shifted to recognise or facilitate this learning. This article presents findings from an interview-based study of professionals in Australia that investigated their experiences of work and learning in a variety of complex adaptive organisations. The focus of this article is on a particular aspect of the study's findings which identified that, despite the organisations studied espousing support for learning through work, the professionals interviewed described learning through engaging in 'fluid work', and that organisational learning and development systems and practices were still largely oriented towards formality and structure. The study contributes to the research field of work and learning, through the use of complex adaptive systems theory to examine how organisational complexity influences professionals' experiences of work and learning. It also empirically indicates the interrelatedness of work and learning in complex adaptive organisations. The implications of this study suggest that the focus for understanding and reforming organisational learning and development systems and practices needs to shift away from structure and measurement and towards the interplay of organisational complexity, fluidity of work, and experiences of learning primarily through work.

Keywords: workplace learning; complexity; complex adaptive systems

Introduction

Although research over recent decades has established that professionals learn through work (Ellström, Ekholm, and Ellström 2008; Billett and Choy 2013; Eraut 2011; Unwin et al. 2007), organisations have continued to privilege structured learning approaches (Moore and Klein 2020; Berg and Chyung 2008). This article discusses findings from an interview-based study of Australian professionals from a variety of industry sectors that investigated their experiences of work and learning in complex adaptive organisations (CAOs). This article focuses on one aspect of the study's findings, namely, that despite these complex adaptive

organisations espousing a commitment to learning through work, there was a continued focus on structure and formality in their approaches to organisational learning and development. However, in stark contrast to these approaches, the professionals' own experiences of learning were primarily through work.

This study makes two key contributions to the field of work and learning. First, it uses a complex adaptive systems approach to examine how organisational complexity influences professionals' experiences of work and learning. Second, this empirical study indicates that work and learning are interrelated in complex adaptive organisations and should be investigated concurrently. The latter contribution also has implications for learning and development systems and practices in organisations which have tended to rest on psychological assumptions of learning (Lizier 2017).

In this article, we explore this apparent disconnection between the tendency of individual professionals to learn through work, and the learning and development processes and practices of organisations as viewed by the professionals and as described in organisational documentation such as learning and development strategy documents, training calendars, and annual development planning processes. Central to this discussion is using a 'complexity lens' to frame the study, which highlighted the ways in which organisational complexity pulls professionals towards learning through work as the most flexible and adaptable way of learning.

We commence with a discussion of the shifts in the workplace learning literature, particularly with regard to complexity. This is followed by an overview of the research study and its methodology followed by a discussion of the disconnection between professionals' experiences of learning through 'fluid work' and the structured nature of their organisations' learning and development practices. It concludes with the implications of the study for work and learning in organisations.

Shifts in work and learning approaches

Theoretical perspectives related to work and learning research have shifted over recent decades from the psychological theories of behaviourism and cognitivism that were dominated by metaphors of acquisition and transfer and foregrounded the individual acquisition of skills and knowledge within the context of doing a particular job (Fenwick and Tennant 2007; Hager 2011; Sfard 1998). Such psychological theories consider work and learning as the transfer of skills and knowledge to an individual learner whose mind is likened to a "container for knowledge" needing to be filled (Bereiter 2002), thus minimising the role of what cannot be readily observed (Hager 2011; Kalantzis and Cope 2012) and jobs being defined as a series of skills that one is trained in and then performs to establish competence (Reich et al. 2015). Many of the traditional learning and development practices in organisations are based on these theories.

In contrast, socio-cultural theories of work and learning align with metaphors of participation and posit learning at work as an ongoing process that occurs through participation in work and is shaped by the context in which the learner is located (Eraut 2007; Hager and Hodkinson 2009; Billett 2004). A key feature of these theories is the foregrounding of participation in work as a key learning mechanism, where learning occurs through the process of working through any problems or new tasks that arise day-to-day (Boud and Hager 2012). More recent theoretical shifts towards complexity, post-modern and practice approaches (Hager 2011) position learning as an ongoing process that is not necessarily specifiable in advance and invoke metaphors of becoming (Hager and Hodkinson 2009; Boud and Hager 2012) and emergence (Hopwood 2016). Complexity approaches, on which this study is based, position learning as inherently unpredictable and arising from changing and complex contexts. The most commonly used complexity concept within the

work and learning literature is emergence (e.g. Buckley and Monks 2008; Chiva, Grandío, and Alegre 2010; Hopwood 2014; Manidis and Scheeres 2013; Hager and Beckett 2019).

Complexity approaches have been increasingly used to investigate work and learning in contemporary organisations in response to broader changes in the global economy (see Billett and Choy 2013; Dicken 2015; Antonacopoulou et al. 2019; Marsick et al. 2017) and the rapid application of technology within organisations (Fenwick and Edwards 2016). Today's professional is likely to work for several organisations over the course of their career and in projects that might involve multiple project teams, including virtual teams scattered across time zones and cultures. Professionals are also increasingly likely to engage in contingent work in the "gig" or platform economy (Scully-Russ and Torraco 2020). For those professionals who retain relatively stable work within organisations, there are fewer opportunities for career advancement within organisations and there is an increasing emphasis on personal responsibility for one's learning (Baruch and Bozionelos 2011).

Complexity approaches to work and learning

Researchers have begun using complexity concepts to understand work and learning (Fenwick 2010b, 2010a, 2012; Fenwick, Edwards, and Sawchuk 2011; Hager and Beckett 2019), but they have not necessarily applied a specific complex adaptive systems approach. Complex adaptive systems (CAS) are described as systems containing agents that have a drive toward adaptation; where the agents adapt their strategies for operating within the system in order to increase their chances of success and where adaptation is usually achieved through learning processes (Holland 1995).

Some researchers have used CAS approaches in studies of learning. Desai (2010) drew on the notion of co-creation of learning at work to propose that CAS approaches have better explanatory power for appreciating work and learning. For Jones and Corner (2012), an understanding of mentoring relationships as CAS that reflect contemporary contexts of work

may offer practical options for improving mentoring practices. Similarly, CAS concepts have been used to re-theorise leadership "as a complex interactive dynamic from which adaptive outcomes (e.g. learning, innovation, and adaptability) emerge" (Uhl-Bien, Marion, and McKelvey 2007, 298). Buckley and Monks (2008) have also used a CAS approach to consider management education (see also Langton 1990).

As highly networked and changeable organisational contexts are placing new and unprecedented demands on professionals' abilities to learn and adapt quickly and efficiently (Noe, Clarke, and Klein 2014), CAS concepts, as used in this study, offer a rich way in which to understand these contexts.

The Research Study

This article draws on an interview-based study framed by the *complex adaptive systems conceptual framework* (CAOCF) (Lizier 2017) to investigate professionals' experiences of work and learning in Australian organisations characterised by uncertainty and increasing rates of change. The participating professionals also provided rich insights into the learning and development systems and practices of CAOs from the perspective of the professionals.

Referring to participants in the study as professionals is a deliberate labelling that best describes the nature of their work, namely office-based and non-manual, without adopting the contested term "knowledge workers" (Brint, 2001; Farrell & Fenwick, 2007; Fuller & Unwin, 2010). Although the term professional has traditionally denoted an individual who worked within a profession (e.g., law, medicine, architecture) the term has broadened over time to denote office workers more generally. In Australian universities, for example, administrative, allied, general, and non-academic staff are most often referred to by the term "professional staff" (Szekeres, 2011). Professional is therefore used in the context of this study to refer to the office-workers interviewed who worked across a range of job areas.

The conceptual framework

The CAOCF (Lizier 2017) was developed specifically for this study to research work and learning in contemporary organisations. It uses CAS theory to frame work and learning in organisations that face rapid and complex changes (Billett and Choy 2013; Walton 2016). Figure 1 provides a visual representation of the framework. Complex adaptive organisations (CAO) are made up of individual professionals who learn and adapt, act with agency and interact through complex social networks as part of their work (Lizier 2017). These complex social networks have numerous local connections but fewer, though still significant, extended connections to other parts of the organisation or to other organisations (Barabási and Albert 1999; Watts and Strogatz 1998). A key concept of the CAOCF is the shaping of the CAO by four key elements: emergence, adaptation, complex social networks, and agency.
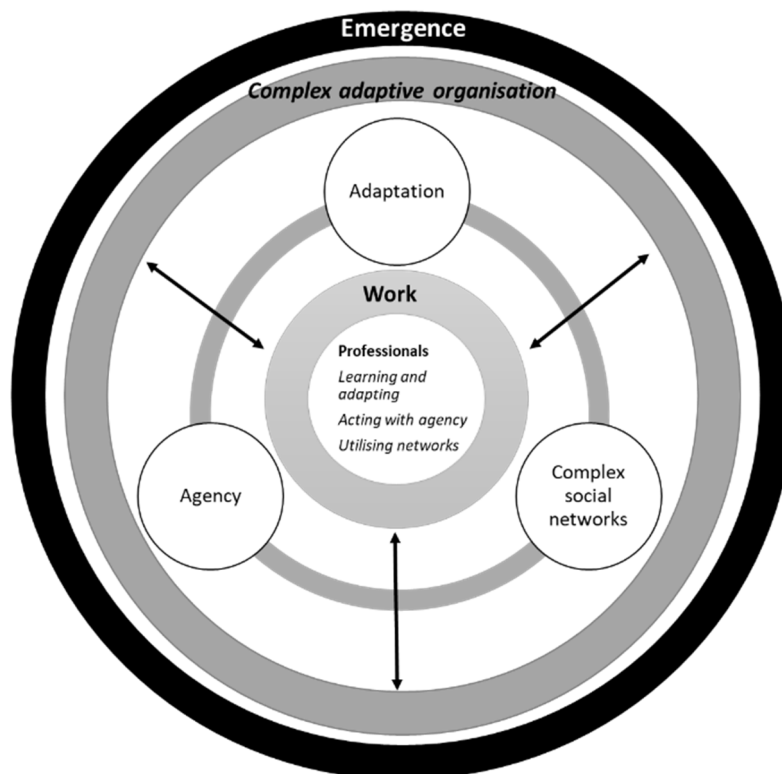

Figure 1: Complex adaptive organisation conceptual framework (Lizier 2017).

As a critical part of a CAO, *emergence* describes how the interactions of individual actors in a system contribute to patterns that are not predictable (Jacobson, Levin, and Kapur 2019; Jacobson and Wilensky 2006; Sawyer 2005). The CAOCF uses the particular concept of reflexive emergence, which is suited to systems such as organisations "where the agents (actors) in the system under study are self-aware and linguistically capable" (Goldspink and Kay 2010, 48). In CAOs, emergence is therefore a process by which professionals interact reflexively and linguistically, contributing to patterns that are not able to be completely predicted or directed.

It is emergence that drives the need for *adaptation* in CAOs, and learning is a key enabler of adaptation. Adaptation is defined here as one's capacity to adjust to emergent environmental demands. Learning in CAOs is best understood as a continual process of developing expertise, using complex social networks to adapt to emergence in the organisation (Lizier 2017).

Complex social networks are neither completely regular nor completely random (Newman 2010). The CAOCF adopts a sub-set of complex social networks referred to as small-world networks, (Barabási and Albert 1999; Watts and Strogatz 1998). In a workplace, small-world network connections would be mainly among immediate colleagues with fewer, yet still important, longer connections to other individuals and teams external to the immediate workplace. Professionals working and learning in CAOs are highly interconnected, sometimes in spite of the formal hierarchies of the organisation.

Agency, unlike the other three elements of CAOs, is not drawn from the complexity literature but from research into work and learning. Within CAOs, agency is "effective, intentional, unconstrained, and reflexive action by individual or collective actors" (Dietz and Burns 1992, 187). All actors in the network have a degree of agency; however, no single actor or group has unconstrained agency (Dietz and Burns 1992). Agency occupies a central

role in work and learning (Billett 2011; Eteläpelto et al. 2013; Harteis and Goller 2014; Tynjala 2013; Vähäsantanen et al. 2017), and its inclusion as a key element of the CAOCF emphasises the ability of professionals to determine their own actions within the boundaries of the organisational system where they are "responsible and active actors in work contexts" (Vähäsantanen et al. 2017, 2).

Methodology

The key research method used in the study was an adapted phenomenographic approach (Marton 2000, 1986; Marton and Booth 1997) that aimed to examine the different ways in which the participating professionals experienced work and learning in CAOs. Phenomenographic studies usually investigate a single phenomenon, such as learning (Ãkerlind 2017). This study adapted the phenomenographic approach in two ways. First, in order to simultaneously investigate the experiences of the dual phenomena – work and learning – the research design combined key phenomenographic elements with a single analysis for experiences of both work and learning (Bailey 2015). Second, in keeping with the CAS framing of this study, the commonly held phenomenographic assumption of a hierarchy of categories (Tight 2016) was abandoned in favour of conducting the analysis with a more open frame of mind, not specifically looking for a hierarchy in the categories (Ãkerlind 2005).

Semi-structured interviews were conducted with 14 professionals in Australia. A purposive sampling approach, common in phenomenography, was used to identify participants whose selection would further the aims of the research (Yates, Partridge, and Bruce 2012). Participants were strategically selected from a range of industries and occupational levels within nine organisations located within Sydney, Australia. The industry sectors included: professional services; professional education and advocacy; banking; retail; radio and television; scientific research; aviation; and pharmaceuticals. Interviews used a

mixture of direct and critical incident questions (Butterfield et al. 2005) to assist participants reflect on how they had learned at work. More than 16 hours of audio recordings of interviews were transcribed. Organisational documents such as learning and development strategy documents, training calendars, and annual development planning processes were also collected from each organisation and analysed using the CAOCF. The insights through the article into organisational learning and development systems and practices come from the interviews with the professionals where they relate their experiences of both formal and less formal learning within their respective organisations. It is also confirmed by the document analysis of the organisations' key learning and development documents.

The next two sections discuss key findings of the research study: (1) professionals experienced learning primarily through fluid work, and (2) the organisations continued to privilege structured learning. Although these two phenomena appear disconnected, we suggest using the CAOCF opens up a way of understanding the complexity of work and learning in these CAOs, with implications for establishing new connections.

Professionals experience learning through fluid work

The participating professionals described their situations as "learning through work", "informal learning", and their learning as "self-directed". These findings support existing research on learning at work (Billett 2004; Boud and Hager 2012; Eraut 2007). We use the expression *fluid work* to identify learning that occurs as a key part of a job.

"Fluid work" here differs from other recent usages of the term that have focused on describing work contexts or structures (see Allard and Bleakley 2016; González-Martínez et al. 2016; Holmberg, Larsson, and Bäckström 2016; Smith and McDonald 2015; Xinwei, Lorne, and Jingbing 2016; Butler 2020). Fluid, in the sense that we use it, contrasts with the idea of work being structured and planned, and fluid work refers to the experience of work that emerged from the day-to-day tasks encountered by the participating professionals. This

idea reflects shifts in the broader literature of both organisational studies and work and learning studies towards adopting terminology such as "becoming", or "organising", which suggest fluid processes rather than static features of workplaces as sites of learning (Clegg, Kornberger, and Rhodes 2005; Gherardi 2009; Hager 2008; Hopwood 2016; Schatzki 2006).

The findings of this study emphasise the fluid and changeable nature of professionals' day-to-day work tasks in complex organisational contexts. As one participant, an executive assistant in an organisation, noted:

> Everything changes now. You kind of just go bend with everything and go with the flow with whatever's happening, you know. You can plan your day to look like something but it never pans out that way.

Other professionals interviewed also described their work as being changeable and often unpredictable, requiring rapid and flexible learning and adaptation to problem-solve and get their jobs done. A researcher at a government scientific organisation noted:

> The biggest thing day-to-day is just trying to solve the problems in your research that you encounter day-to-day and they're not really things that you can plan for in advance.

And a sales manager said:

> The things I'm learning are very much on the job, on the instant, on the fly anyway to some degree.

In summary, the study found that fluid work was influenced by organisational complexity and, in turn, pulled professional towards more flexible learning responses.

Privileging of structured learning in CAOs

Despite claiming that they learned through fluid work, the participating professionals also reported an enduring organisational emphasis on structured learning. A Training and Compliance Manager from an airline characterised the learning and development systems and practices in her organisation as, "If you're not in the classroom, you're not doing training."

Such quotations highlight how these professionals saw their organisations as tending to focus on face-to-face and online training programs that emphasise measurement and reporting and are supported by structured practices typically managed centrally by a Human Resources department. In addition to a menu of available learning/training options, these practices included mandatory compliance training, professional development plans, and attendance at networking and learning opportunities outside of the organisation. The study found that most of these practices were underpinned by competency and capability frameworks that are disconnected from the learning of professionals during work and "largely exist independent of the contexts in which practitioners operate" (Reich, Rooney, and Boud 2015, 139).

The participating professionals reported that activities such as annual professional development plans highlight the ways organisations privilege structure and measureable learning activities. For example, several professionals related accounts of selecting face-to-face courses just to include them on their professional development plans and show their managers that they were "doing something" about their learning. As a Buying Executive from a retail organisation related,

> We have annual performance agreements that, you know, contain some element of training and development and typically that's guided towards more formal things … you might find a course on something you want to do that you put in there.

This privileging of structured learning was also reflected in the professionals reporting that they needed to have a formal recognition of their learning for their ongoing career advancement. As a State Sales Manager reported:

> I would take the course so I have something to show for it, something to say yes, I do actually have those skills. Because I know that looking for future employment for example, well they want to see qualifications which sometimes, although not always correctly, the qualifications are written down on the CV speaks louder than the experience you have.

As indicated in the excerpt above, there remains an organisational emphasis on structured learning as well as a broader system of continuing professional recognition in organisations which reinforces a structured learning approach. The structured learning and development initiative took numerous forms. One example described by a Remuneration Manager from a pharmaceutical company was:

> We have a thing called Pharma University ... it is a corporate thing but I think that's going to be more driven out of a talent approach, so if you're identified as key talent these are the sort of programs that will work for you through [company name] University.

Learning opportunities available, as described by the professionals and confirmed through organisational documents, were often contingent on the creation of a "personal professional development plan" that was approved by the professional's supervisor. Although personal development plans were intended to be a collaborative effort between an professional and their manager, these were often completed by the professional before being 'signed-off' by the manager (if they were completed at all). An early career scientist from a government organisation noted in relation to the creation of her personal development plan:

> It's pretty clear what's going in there and you just alter it based on what you are going to be doing anyway' before the manager 'rubber stamped it'.

Personal professional development plans were created to fulfil an obligation but seldom, if ever, referred to again. Professionals reported struggling with the formal processes of learning imposed by their organisations in terms of how to interpret these plans into something meaningful for their job and career. A Regional Director of a pharmaceutical company who worked in a virtual team commented about his personal development plan:

> I struggle to do my [personal] development plan and identify my learning … I don't even know what I put in it! I'm just ticking boxes.

While organisations' internal learning frameworks sometimes contained elements of less-structured learning, subscribing to the rhetoric around self-responsibility and learning through work, the participating professionals experienced them more commonly as face-to-face courses, professional development seminars, or qualifications that were easily quantified.

The disconnection between fluid professional learning through work and formal structuring of learning and development is apparent in the adoption of the 70:20:10 learning framework (Kajewski and Madsen 2013; Johnson, Blackman, and Buick 2018) by many of the organisations studied. As a Knowledge Manager from a professional services firm noted, "There is the, ever present, 70:20:10 rule."

The adoption of the contested 70:20:10 framework is a common trend in organisations in Australia and other countries (Johnson, Blackman, and Buick 2018), despite it being criticised for lacking empirical support (Jefferson and Pollock 2014; Kajewski and Madsen 2013; Clardy 2018). This framework proposes that 70% of learning is through work experiences, 20% through interactions with others (e.g. coaching or mentoring), and the remaining 10% through formal learning such as face-to-face and online courses (McCall, Lombardo, and Morrison 1988; Johnson, Blackman, and Buick 2018). Of the nine organisations involved in this study there was evidence from professional interviews and from organisational documents that eight had implemented, or were in the process of implementing, the 70:20:10 framework. However, despite this widespread adoption of the 70:20:10 framework and espoused organisational commitments to less formal learning, the study found that the learning experiences of individual professionals were largely structured as face-to-face or online courses. A Learning Projects Manager from a bank noted:

> I would say where we have some of the less formal arrangements, I think we kind of put structures around them that really tip them back into being a formal arrangement. So, for example, we know that a lot of coaching takes place, but we also know that really only takes place when we are putting some structure around it.

The widespread adoption of the 70:20:10 framework, as reported by the professionals and in organisational documents, provides evidence of how the studied organisations attempted – intentionally or unintentionally – to align their learning and development practices with the research literature. However, these practices were frequently at odds with the day-to-day experiences of the participating professionals, who experienced learning primarily through fluid work.

Beyond disconnections: Ongoing tensions between learning at work and organisations' learning and development systems and practices

It is a common trend in contemporary organisations to privilege structured learning, building it into business processes that require formal training plans and reporting (Hiniker and Putnam 2009) and continuing professional education frameworks (Reich, Rooney, and Boud 2015), a trend reflected in these Australian organisations. Such processes focus on the measurement of outcomes and are often seen as a means to implement broader strategic initiatives for competitive advantage (Greenan 2016). While many of the participating professionals described how they learned and adapted through engaging in fluid work, the learning and development systems and practices they described and in the analysed organisational documents, were characterised by structure and formality. These practices appeared to sustain psychological assumptions that learning is a product to be acquired and transferred (Hager and Hodkinson 2009), in contrast to the professionals' lived experiences of learning reflecting metaphors of participation, becoming, and emerging.

This study also highlights the persistent false dichotomy between formal and informal learning, where informal learning is often defined in opposition to formal learning (Marsick 2009). Although research across multiple countries has found that so-called formal and informal learning influence one another (Schürmann and Beausaert 2016; Khandakar and Pangil 2019; Jeon and Kim 2012), these concepts are often viewed in contrast to one another.

Indeed, Malcolm, Hodkinson, and Colley (2003) argue that the terms formal and informal learning are redundant, proposing instead a continuum of formality and informality in work and learning as there are often elements of formal and informal learning in most learning experiences.

The continuum argument is supported by the findings of this study. Professionals reported that even learning experiences that were ostensibly formal (e.g., face-to-face courses) had significant elements of informality that both attracted the professionals to the experience as well as shaped their learning from the experience. For example, professionals reported viewing face-to-face courses as an opportunity for building and developing social networks and to learn from other people. As the remuneration manager from Pharmaceutical 2 noted:

> *My preference would probably be face-to-face in some sort of workshop because you get the benefit of hearing other people's stories and experiences. Sometimes that provides you with a light bulb moment where you can go "oh I hadn't thought about that" and you might not always get that through self-paced learning.*

This excerpt highlights how elements of formality and informality are found across all learning experiences (Malcolm et al., 2003) forming a core part of the experience of learning in complex adaptive organisations.

The findings of this study also suggest that the false dichotomy of formal and informal learning is still entrenched in the rhetoric and practices of organisations. This study found that the professionals tended to juxtapose what they termed 'informal learning', learning that was unstructured, experiential, and often incidental (Marsick et al. 2017), with 'formal' or 'structured learning' through face-to-face courses and structured online programs. The adoption of the 70:20:10 framework among the organisations where the participating

professionals worked appears to have reinforced this juxtaposition in representing learning as being neatly divided between work experiences, interactions with others and formal learning such as courses (Kajewski and Madsen 2013).

The use of a complex adaptive systems approach has provided useful theoretical tools to challenge this dichotomy and open new ways of understanding learning, organisational complexity and 'fluid work' (Lizier 2017), highlighting how 'informal learning', or learning through fluid work is often invisible within organisations where 'formal' or structured learning is privileged (Berg and Chyung 2008). It has also demonstrated how the participating professionals may indeed have experienced learning as occurring and emerging through work, but this experience was very often disconnected from their organisations' focus on structured learning.

Fuller and Unwin's (2003) expansive-restrictive framework provides valuable insight into why these Australian organisations seem to have not responded effectively to the complex challenges of fluid work to their learning and development systems and practices. The expansive-restrictive framework proposes that expansive practices create a richer learning environment than restrictive practices; expansive practices include access to a wide range of formal and informal learning experiences; organisational recognition of workers as learners, and the provision of opportunities for reflection (Fuller and Unwin 2003). Despite providing a range of structured and less-formal learning experiences, the organisations in this study did not appear to recognise professionals as learners unless they were engaged in more restrictive learning activities, such as a face-to-face or online courses. Nor did the participating professionals recognise themselves as learners who were engaging in expansive learning processes. In particular, they had limited opportunities for reflection on the increasing demands of fluid work because reflection – an expansive learning practice – was not encouraged by their organisations.

In summary, this study found that while participating professionals could acknowledge the fluidity of work already happening in their practices, they reported that their organisations were scarcely able to recognise the flexibility needed for adapting to highly networked and changeable work contexts. Despite the organisations where the professionals worked being quite different from one another; the professionals reported experiencing their organisations' learning initiatives as being primarily structured, a finding that was also supported by organisational documentation. These findings were consistent regardless of the degree of work fluidity experienced by the professionals.

In these organisations, learning through work was predominantly seen by the participating professionals as "doing my job" and problem solving rather than learning, whereas they reported that their organisations favoured structured learning because this was seen as "real" and measurable. Unstructured, or less structured ways of learning are more embedded in everyday work and so become invisible and taken for granted (Berg and Chyung 2008).

Conclusion

Significant changes in the nature of work and organisations over recent decades have required professionals to learn and adapt quickly (Noe, Clarke, and Klein 2014). Despite shifts in work and learning theory from psychological approaches towards postmodern, complexity, and practice approaches (Hager 2011), organisations have been slow to adapt. They continue to base their learning and development systems and practices on assumptions about learning as a process of acquisition and transfer focused primarily on individual learning. In this article, we have used the CAOCF to highlight a disconnection between the learning and development systems and practices of organisations and the day-to-day learning of professionals engaged in fluid work as experienced by the professionals. While organisational rhetoric may signal to professionals that learning though work is important and

valued, the daily experience of the professionals participating in this study, and organisational documentation, suggests otherwise. Taking a complex adaptive systems approach has reinforced the entwinement of work and learning and foregrounded the work still to be done in shifting learning and development systems and practices in organisations.

The findings of this study have implications for how learning may be negotiated within complex adaptive organisations by moving professionals' learning away from structured approaches as the default approach and towards a greater emphasis on blending formal and informal learning approaches, favouring learning through work, and complex social networks (Lizier 2017). Central to re-developing learning and development systems and practices is exploring new ways of designing learning initiatives that are more embedded in practice and encourage professionals to recognise they are learners outside of structured learning activities. These opportunities could include exploring new ways of embedding learning initiatives in organisational practices, encouraging professionals to recognise they are learners in all their work activities, creating opportunities for expansive practices to create richer learning environments and a greater emphasis on reflection on experience. It will require new considerations of the interplay of organisational complexity, fluidity of work, and experiences of learning primarily through work, to begin to address the ongoing disconnections.

Acknowledgements

References

Ãkerlind, Gerlese S. 2005. "Variation and commonality in phenomenographic research methods." *Higher Education Research & Development* 24 (4):321-34.

———. 2017. "What future for phenomenographic research? On continuity and development in the phenomenography and variation theory research tradition." *Scandinavian Journal of Educational Research*:1-10. doi: 10.1080/00313831.2017.1324899.

Allard, Jon, and Alan Bleakley. 2016. "What would you ideally do if there were no targets? An ethnographic study of the unintended consequences of top-down governance in two clinical settings." *Advances in Health Sciences Education* 21 (4):803-17. doi: 10.1007/s10459-016-9667-8.

Antonacopoulou, Elena P., Christian Moldjord, J. Steiro Trygve, and Christina Stokkeland. 2019. "The New Learning Organisation: PART I – Institutional Reflexivity, High Agility Organising and Learning Leadership." *The Learning Organization* 26 (3):304-18. doi: 10.1108/TLO-10-2018-0159.

Bailey, Moira. 2015. "Professional development of HR practitioners - A phenomenographic study." *European Journal of Training and Development* 39 (3):220-38.

Barabási, Albert-László, and Réka Albert. 1999. "Emergence of scaling in random networks." *Science* 286 (5439):509-12.

Baruch, Y., and N. Bozionelos. 2011. "Career issues." In *APA Handbook of Industrial and Organizational Psychology, Volume 2: Selecting and Developing Members of the Organization*, edited by S. Zedeck, 67-113. Washington, DC: American Psychological Association.

Berg, Shelley A., and Seung Youn Chyung. 2008. "Factors that influence informal learning in the workplace." *Journal of Workplace Learning* 20 (4):229-44.

Billett, Stephen. 2004. "Co-participation at work: Learning through work and throughout working lives." *Studies in the Education of Adults* 36 (2):190-205.

———. 2011. "Subjectivity, self and personal agency in learning through and for work." In *The SAGE Handbook of Workplace Learning*, edited by Margaret Malloch, Len Cairns, Karen Evans and Bridget N. O'Connor, 60-72. London: SAGE Publications Ltd.

Billett, Stephen, and Sarojni Choy. 2013. "Learning through work: Emerging perspectives and new challenges." *Journal of Workplace Learning* 25 (4):264-76.

Boud, David, and Paul Hager. 2012. "Re-thinking continuing professional development through changing metaphors and location in professional practices." *Studies in Continuing Education* 34 (1):17-30.

Buckley, F., and K. Monks. 2008. "Responding to managers' learning needs in an edge-of-chaos environment: Insights from Ireland." *Journal of Management Education* 32 (2):146.

Butler, S. 2020. "Never too old to work: Managing an age diverse workforce." *Strategic HR Review* ahead-of-print (ahead-of-print).

Butterfield, Lee D., William A. Borgen, Norman E. Amundson, and Asa-Sophia T. Maglio. 2005. "Fifty years of the critical incident technique: 1954-2004 and beyond." *Qualitative Research* 5 (4):475-97.

Chiva, Ricardo, Antonio Grandío, and Joaquín Alegre. 2010. "Adaptive and generative learning: Implications from complexity theories." *International Journal of Management Reviews* 12 (2):114-29.

Clardy, Alan. 2018. "70-20-10 and the dominance of informal learning: A fact in search of evidence." *Human Resource Development Review* 17 (2):153-78. doi: 10.1177/1534484318759399.

Clegg, Stewart R., Martin Kornberger, and Carl Rhodes. 2005. "Learning/Becoming/Organizing." *Organization* 12 (2):147.

Desai, Darsham A. 2010. "Co-creating learning: Insights from complexity theory." *The Learning Organization* 17 (5):388-403.

Dicken, Peter. 2015. *Global shift : Mapping the changing contours of the world economy*. 7th ed. London, UK: Sage Publications Ltd.

Dietz, Thomas, and Tom R. Burns. 1992. "Human agency and the evolutionary dynamics of culture." *Acta Sociologica* 35 (3):187-200.

Ellström, Eva, Bodil Ekholm, and Per-Erik Ellström. 2008. "Two types of learning environment: Enabling and constraining a study of care work." *Journal of Workplace Learning* 20 (2):84-97. doi: http://dx.doi.org/10.1108/13665620810852250.

Eraut, M. 2007. "Learning from other people in the workplace." *Oxford Review of Education* 33 (4):403-22.

———. 2011. "Informal learning in the workplace: evidence on the real value of work-based learning (WBL)." *Development and Learning in Organizations: An International Journal* 25 (5):8-12.

Eteläpelto, Anneli, Katja Vähäsantanen, Päivi Hökkä, and Susanna Paloniemi. 2013. "What is agency? Conceptualizing professional agency at work." *Educational Research Review* 10:45-65.

Fenwick, Tara. 2010a. "Escaping/becoming subjects: Learning to work the boundaries in boundaryless work." In *Work, Subjectivity and Learning: Understanding Learning through Working Life*, edited by Stephen Billett, Tara Fenwick and Margaret Somerville, 21-36. Dordrecht: Springer Netherlands.

———. 2010b. "Re-thinking the "thing"." *Journal of Workplace Learning* 22 (1/2):104.

———. 2012. "Matterings of knowing and doing: Sociomaterial approaches to understanding practice." In *Practice, Learning and Change*, edited by Paul Hager, Alison Lee and Ann Reich, 67-83. Springer Netherlands.

Fenwick, Tara, and Richard Edwards. 2016. "Exploring the impact of digital technologies on professional responsibilities and education." *European Educational Research Journal* 15 (1):117-31. doi: doi:10.1177/1474904115608387.

Fenwick, Tara, Richard Edwards, and Peter Sawchuk. 2011. *Emerging approaches in educational research: Tracing the socio-material*. London: Routledge.

Fuller, Alison, and Lorna Unwin. 2003. "Learning as apprentices in the contemporary UK workplace: Creating and managing expansive and restrictive participation." *Journal of Education and Work* 16 (4):407-26.

Gherardi, Silvia. 2009. "Knowing and learning in practice-based studies: An introduction." *The Learning Organization* 16 (5):352-9. doi: doi:10.1108/09696470910974144.

Goldspink, C., and Robert Kay. 2010. "Emergence in organizations: The reflexive turn." *Emergence: Complexity & Organization* 12 (3):47-63.

González-Martínez, Esther, Adrian Bangerter, Kim Lê Van, and Cécile Navarro. 2016. "Hospital staff corridor conversations: Work in passing." *Journal of Advanced Nursing* 72 (3):521-32. doi: 10.1111/jan.12842.

Greenan, Peter. 2016. "Personal development plans: Insights from a case based approach." *Journal of Workplace Learning* 28 (5):322-34.

Hager, Paul. 2008. "Learning and metaphors." *Medical Teacher* 30 (7):679-86.

———. 2011. "Theories of workplace learning." In *The SAGE Handbook of Workplace Learning*, edited by M. Malloch, L. Cairns, K. Evans and B. N. O'Connor. London: SAGE Publications Ltd.

Hager, Paul, and David Beckett. 2019. *The emergence of complexity: Rethinking education as a social science*, *Perspectives on rethinking and reforming education*. Switzerland: Springer Nature.

Hager, Paul, and Phil Hodkinson. 2009. "Moving beyond the metaphor of transfer of learning." *British Educational Research Journal* 35 (4):619-38. doi: 10.1080/01411920802642371.

Harteis, Christian, and Michael Goller. 2014. "New skills for new jobs: Work agency as a necessary condition for successful lifelong learning." In *Promoting, assessing, recognizing and certifying lifelong learning: International perspectives and practices*, edited by Stephen Billett, T. Halttunen and M. Koivisto, 37-56. Dortrecht: Springer.

Hiniker, LuAnn, and Robert A. Putnam. 2009. "Partnering to meet the needs of a changing workplace." In *International Handbook of Education for the Changing World of Work: Bridging Academic and Vocational Learning*, edited by Rupert Maclean and David Wilson, 203-17. Dordrecht: Springer Netherlands.

Holmberg, Robert, Magnus Larsson, and Martin Bäckström. 2016. "Developing leadership skills and resilience in turbulent times: A quasi-experimental evaluation study." *Journal of Management Development* 35 (2):154-69. doi: doi:10.1108/JMD-09-2014-0093.

Hopwood, Nick. 2014. "Four essential dimensions of workplace learning." *Journal of Workplace Learning* 26 (6):349-63.

———. 2016. *Professional practice and learning: Times, spaces, bodies, things*. Dordrecht: Springer.

Jacobson, Michael J., James A. Levin, and Manu Kapur. 2019. "Education as a complex system: Conceptual and methodological implications." *Educational Researcher* 48 (2):112-9. doi: 10.3102/0013189x19826958.

Jacobson, Michael J., and Uri Wilensky. 2006. "Complex systems in education: Scientific and educational importance and implications for the learning sciences." *Journal of the Learning Sciences* 15 (1):11-34.

Jefferson, A., and R. Pollock. 2014. "70:20:10: Where Is the Evidence?" In.: Association for Talent Development.

Jeon, KiSeok, and Kyung-Nyun Kim. 2012. "How do organizational and task factors influence informal learning in the workplace?" *Human Resource Development International* 15 (2):209-26. doi: 10.1080/13678868.2011.647463.

Johnson, Samantha J., Deborah A. Blackman, and Fiona Buick. 2018. "The 70:20:10 framework and the transfer of learning." *Human Resource Development Quarterly* 29 (4):383-402. doi: 10.1002/hrdq.21330.

Jones, Rachel, and James Corner. 2012. "Seeing the forest and the trees: A complex adaptive systems lens for mentoring." In *Human Relations*.

Kajewski, Kelly, and Valerie Madsen. 2013. "Demystifying 70:20:10 White Paper." *Deakin Prime, Deakin University, Melbourne VIC Australia*.

Khandakar, Md Shariful Alam, and Faizuniah Pangil. 2019. "Relationship between human resource management practices and informal workplace learning: An empirical study." *Journal of Workplace Learning* 31 (8):551-76. doi: 10.1108/JWL-04-2019-0049.

Lizier, Amanda L. 2017. "Investigating work and learning through complex adaptive organisations." *Journal of Workplace Learning* 29 (7/8):554-65. doi: 10.1108/JWL-05-2016-0033.

Malcolm, Janice, Phil Hodkinson, and Helen Colley. 2003. "The interrelationships between informal and formal learning." *Journal of Workplace Learning* 15 (7):313-8.

Manidis, Marie, and Hermine Scheeres. 2013. "Practising knowing: Emergence(y) teleologies." *Educational Philosophy and Theory* 45 (12):1230-51.

Marsick, Victoria J. 2009. "Toward a unifying framework to support informal learning theory, research and practice." *Journal of Workplace Learning* 21 (4):265-75.

Marsick, Victoria J., Karen E. Watkins, Ellen Scully-Russ, and Aliki Nicolaides. 2017. "Rethinking informal and incidental learning in terms of complexity and the social context." *Journal of Adult Learning, Knowledge and Innovation* 1 (1):27-34. doi: 10.1556/2059.01.2016.003.

Marton, F. 1986. "Phenomenography-A research approach to investigating different understandings of reality." *Journal of Thought* 21:28-49.

———. 2000. "The structure of awareness." In *Phenomenography*, edited by J.A. Bowden and Eleanor Walsh, 102-16. Melbourne: RMIT University Press.

Marton, F., and Shirley Booth. 1997. *Learning and Awareness*. Mahwah, NJ: Lawrence Erlbaun Associates.

McCall, Morgan W. Jr, Michael M Lombardo, and Ann M Morrison. 1988. *The Lessons of Experience: How Successful Executives Develop on the Job*. New York: The Free Press.

Moore, Alison L., and James D. Klein. 2020. "Facilitating Informal Learning at Work." *TechTrends* 64 (2):219-28. doi: 10.1007/s11528-019-00458-3.

Newman, M. E. J. 2010. *Networks: An introduction*. Oxford: Oxford University Press.

Noe, Raymond A. , Alena D.M. Clarke, and Howard J. Klein. 2014. "Learning in the twenty-first-century workplace." *Annual Review of Organizational Psychology and Organizational Behavior* 1 (1):245-75. doi: 10.1146/annurev-orgpsych-031413-091321.

Reich, Ann, Donna Rooney, and David Boud. 2015. "Dilemmas in continuing professional learning: Learning inscribed in frameworks or elicited from practice." *Studies in Continuing Education* 37 (2).

Sawyer, R. Keith. 2005. *Social emergence: Societies as complex systems*. Cambridge: Cambridge University Press.

Schatzki, Theodore R. 2006. "On organizations as they happen." *Organization Studies* 27 (12):1863-73.

Schürmann, Eva, and Simon Beausaert. 2016. "What are drivers for informal learning?" *European Journal of Training and Development* 40 (3):130-54. doi: doi:10.1108/EJTD-06-2015-0044.

Scully-Russ, Ellen, and Richard Torraco. 2020. "The Changing Nature and Organization of Work: An Integrative Review of the Literature." *Human Resource Development Review* 19 (1):66-93. doi: 10.1177/1534484319886394.

Smith, Natalie, and Paula McDonald. 2015. "Facilitating sustainable professional part-time work: A question of design?" *Journal of Management & Organization* 22 (2):205-23. doi: 10.1017/jmo.2015.27.

Tight, Malcolm. 2016. "Phenomenography: The development and application of an innovative research design in higher education research." *International Journal of Social Research Methodology* 19 (3):319-38.

Tynjala, Paivi. 2013. "Toward a 3-P model of workplace learning: A literature review." *Vocations and Learning* 6 (1).

Uhl-Bien, Mary, Russ Marion, and Bill McKelvey. 2007. "Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era." *The Leadership Quarterly* 18 (4):298-318.

Unwin, Lorna, Alan Felstead, Alison Fuller, Dan Bishop, Tracey Lee, Nick Jewson, and Peter Butler. 2007. "Looking inside the Russian doll: The interconnections between context, learning and pedagogy in the workplace." *Pedagogy, Culture & Society* 15 (3):333-48.

Vähäsantanen, Katja, Susanna Paloniemi, Päivi Hökkä, and Anneli Eteläpelto. 2017. "Agentic perspective on fostering work-related learning." *Studies in Continuing Education*:1-17. doi: 10.1080/0158037X.2017.1310097.

Walton, Michael J. 2016. "The shifting nature of work and its implications." 45 (2):111-30.

Watts, Duncan, and Steven Strogatz. 1998. "Collective dynamics of `small-world' networks." *Nature* 393 (6684):440-2.

Xinwei, Yuan, Olfman Lorne, and Yi Jingbing. 2016. "How do institution-based trust and interpersonal trust affect interdepartmental knowledge sharing?" *Information Resources Management Journal (IRMJ)* 29 (1):15-38. doi: 10.4018/IRMJ.2016010102.

Yates, Christine, Helen Partridge, and Christine Bruce. 2012. "Exploring information experiences through phenomenography." *Library and Information Research* 36 (112):96-119.