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From the Guest Editors' desk

Contributions of workplace experiences to adults' lifelong learning

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Across the lifespan, working age adults' experiences within and through their work and workplaces make a range of contributions to their ongoing learning and development. Early in their work lives, these experiences variously assist them in identifying the kinds of occupations and work that they want to engage in or decide they are inconsistent with their personal goals and capacities. Those experiences can also

assist these adults develop the occupational capacities and workplace competencies necessary to be effective in working life, sustain their employment and advance their worklife careers. That is, they have the capacity and potential to support their employability across working life. The educative qualities of workplace experiences also can assist in making decisions about transitions and fresh directions, including those beyond working life. Indeed, beyond paid work, many adults' activities post their working lives are shaped by worklife experiences, the capacities they developed, and how they shape adults' sense of self subjectivity. All of these emerge through and across working life. Moreover, beyond their personal learning and development, through experiences across working life, including their voluntary and community-based work activities contributions can benefit their communities, in terms of the goods and services they provide and making viable and sustaining local institutions, including private and public sector enterprises.

Of course, those worklife learning experiences can also be either positive or negative, educative or mis-educative, supportive and inclusive or marginalising and alienating, and also can either realise or frustrate these adults' key life goals. So, more than simply the acquisition, further development and transformation of sets of occupational capacities, those experiences also do much to potentially frame adults' sense of self, worth and life trajectories. In all, these experiences are central to adult learning and development. Given the duration, intensity and ubiquity of adults' learning experiences in and through work and across working life, they stand to be potentially far more consequential than those offerings referred to as lifelong education: usually the provision of taught courses.

It follows then that, in the context of adult learning and considerations of adult education, this special issue seeks to elaborate on the contributions of workplace experiences to adults' lifelong learning broadly. It comprises contributions that identify and elaborate the kinds of goals that adults have for their learning, and the range of educative experiences that can be found in and through work activities and the alignment between these and the kinds of learning and development that might arise for adults.

Consequently, the articles comprising this special issue focus on

capturing and illuminating the experiences provided in and through work and how they contribute to adult learning and development more generally, as well as those associated with occupational capacities and subjectivities and workplace competence. In this way, the special issue is not about workplace learning per se, but rather the kinds of experiences and legacies arising from adults' participation in work practice and the activities and interactions that comprise working life.

In overview, the nine contributions of the special issue are as follows:

In his article Analyzing work and life course learning under capitalism using a mind in political economy approach, Peter Sawchuck discusses worklife learning in terms of the trajectories, transitions and turning points that comprise adults' life courses. It is premised upon the view of both subjective and objective accounts of those life courses and how that comes to shape and meaning for adults biographically. In essence, beyond accounting for the relationship between the inherent problems of work and biographical meaning, it accommodates the relations between the experiences of work and adults' life course. This includes a consideration of processes of alienation and de-alienation that are implicit in the contradictions of power and control within capitalist political economy, culture and society. work These processes are elaborated through the integration of a combination of key concepts— activity, occupation and dramatic perezhivanie— that are captured under the rubric of a "mind in political economy" approach.

The manuscript by Sarojni Choy and Anh Hai Le entitled Workplace practices that support learning across working life illuminates and elaborates the contributions to ongoing learning opportunities arising through workplace experiences that support individuals' employability across working life. Rather than focusing the analysis of that learning in the immediacy of a particular moment, it proposes ways of understanding how those experiences collectively contribute to the ongoing employability of working age adults across working life. It does so by drawing upon data from both worklife history interviews and a survey that provides the basis for advancing and discussing those contributions and working age adults' perspectives of workplace affordances. The findings from the interviews indicate work-based models of learning that help support workers' ongoing learning in, through and across their working lives such conceptions and models

are seen as being helpful for working age adults to maintain currency of knowledge and skills to sustain employment and make contributions to their work workplaces and communities who depend upon the goods and services they produce.

Educational attainment at a tertiary level has been increasing throughout the OECD with an emphasis on graduate learning outcomes and employment outcomes for graduates of tertiary and higher education programs. Natasha Tan et al draw on students' experiences of internships in post-secondary diploma courses in Singapore in the study entitled – Promoting student readiness for work-life through internships: Challenges and support. This work was supported by the Workforce Development Applied Research Fund (WDARF), a national-level fund offered by the SkillsFuture Singapore Agency under Grant [GA19-10]. The study involves a quantitative analysis of interview data to explore students' engagement in and readiness for work with a focus on adaptability and associated affordances and challenges. The authors draw on Giddens's structuration theory to examine the nexus of structure and agency. Numerous considerations are identified for both workplaces and education institutions to promote adaptability and to support students' effective transition to work. These include, but are not limited to the following: design, implementation and evaluation of internships; establishing supportive environments; enabling active engagement in work practices; being mentored; receiving feedback and guidance; and career planning and development.

The correlation between digital technologies and volunteers' learning features in this manuscript. Catherine Arden's study entitled – Social participation, altruism and learning opportunism: A phenomenography of adults' learning through workplace experiences in rural community volunteering – makes a significant contribution to the field of adult and workplace learning. It brings attention to volunteers from an Australian rural community engaged in a socio-technical learning community in a social enterprise. The project aimed to support individuals in the community to create and manage an online portal that would benefit and build the capacity of individuals and the community. Arden's study focuses on volunteers' community-based work experiences and their perceptions of what and how they learned through engagement in the collaborative socio-technical learning community. The findings of this phenomenographic study reveal the value and contribution of workplace

experiences for individual volunteers and the broader community, e.g., individual and group learning, agency, lifelong learning, and capacity-building.

As the learning needs of adults grow in the workplace and society, there is a need to understand the specificities of adult learning and how to support and guide it at work. In the article by Soila Lemmetty and her colleagues entitled – Learning at work in the light of andragogy: What assumptions characterize adult learners in the fields of technology and police work? – returns to the concept of andragogical theory to understand how that learning at and through work might be best supported and guided. The project presented and discussed in this article seeks to illuminate how assumptions arise about how learning amongst working age adults in the workplaces that were investigated. These include a consideration of how work is aligned with contemporary considerations of the andragogical perspective. Whilst finding that assumptions about andragogy are reflected in the data about workplaces as sites of learning, what was often lacking was the acknowledgement of the importance of sociality in that learning. Therefore, this study produces a seventh assumption in the andragogy theory, that of sociability, which is not recognized as strongly by the previous theory. The article concludes by summarizing four broad themes that describe adult learners engaged in police and technology work.

There are circumstances in which performance in work activities needs to be developed through work activities and interactions that are set outside of those in which those performances will be required. Emergency work provides a good example of that kind of work where the preparation for dealing with accidents, events and potential disasters needs to be prepared in advance. The article entitled – Vocational learning of incident commanders in tunnel fire safety work -- by Gabriela Bjørnsen and her colleague reports and discusses one such form of work-based preparation. The focus is on how to prepare firefighters for responding to fires in road tunnels. The focus of the article is on an evaluation of the effectiveness of a pilot course developed for incident commanders involved in tunnel fire safety work. That evaluation leads to discussions about the mechanisms most likely to promote or inhibit the learning and development required to prepare these workers for those tasks and this includes aspects that may not be wholly understood or known about such as the sources of the fire, the

number of vehicles and individuals impacted by it and how the safety of those individuals and extinguishing the fire need to be addressed.

Helen Jossberger and Miriama Schlachtová examine the role of feedback to residents in the medical workplace. Their qualitative study entitled – Specialists' views on feedback at the medical workplace – centres on the purpose and significance of feedback in the domain of radiology taken from the perspective of those giving feedback. Fifteen specialists from four hospitals were interviewed and asked how feedback had influenced their professional development and about their interactions with and provision of feedback to the residents. The authors note, that, to their knowledge, no empirical study in the domain of radiology has explored the perspectives of feedback providers. The authors note a mix of responses with acknowledgement of differences between daily feedback and performance-based feedback. Overall, the roles of feedback in the workplace were to guide radiology practice, to develop social skills, and to prepare residents for future independent specialist work. Integral to the feedback process was the transfer of "domain-specific knowledge". For many of the specialists, their experiences as recipients of feedback in their residency formed the basis for their approaches to feedback. This prompted considerations of training on feedback, a structured approach to giving feedback and time allocated for the feedback. The study captures positive and negative understandings of and approaches to the provision of feedback in the workplace.

PhD students working in universities in Turkey and their experiences of informal workplace learning are the focus of the study by Emine Karaduman, Rukiye Bektas and Ozlem Unluhisarcikli in their article entitled – The experiences of doctoral students working in university settings. The authors interviewed ten PhD students employed at different universities, most of them in the role of research assistants. The study elucidates the value of informal learning in the workplace, challenging negative concepts of informal education arising from its comparison with formal learning. The experiences of the PhD students participation in daily activities, managing unexpected challenges, engaging socially with others, taking on new tasks, and collaborating with others contributed to their understanding of the workplace and business processes and their overall learning. The study also found some PhD students, whose work focused on administrative tasks with little support and few opportunities to participate in decision making,

reported feeling conflicted and demotivated. The findings of the study reveal the affordances and challenges associated with informal learning in the workplace relevant to individuals (PhD students) and organisations (universities).

The manuscript by Chunlin Yao entitled – Exploring the Effects of Working Practice in Cultivating Chinese University Teachers' Professional Identity – accordingly seeks to identify the contributions of working practice to generating higher education teachers' professional identity. It does this through analysis of individual interview data gathered from some of these teachers. Foundational here is that the rationale and purposes that the informants proposed for initially engaging in this work were centered on their interests and job satisfaction that reflect concerns about their sense of self. Yet, through participating in that work it is reported that from those initial conceptions their professional identities have changed significantly. This includes greater interest and focuses on their professional growth, all of which are central to their sense of self as working age adults. The findings also report the importance of the kinds of activities and interactions in and through their work that are likely to lead to the development of specific capacities to be effective in their work but also through the sociality of work have found support and helpfulness in being able to form and sustain an identity as university teachers. In these ways, what is proposed is that of all professional development opportunities it is the day-by-day engagement in work activities that are central to building and sustaining professional identities.

The articles in the special issue present an array of topics and areas of study by researchers from the northern and southern hemispheres. Individually and collectively they capture workplace experiences of adults and the educative experiences in and through work activities. We thank our colleagues for their contributions to the issue, sharing their rich and textured research with us.

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Analysing work and life course learning under capitalism using a mind in political economy approach

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As life course research has long recognized, work and careers are what Pearlin (1988; p.259) describes as "durable arrangements" that serve to "organize experience over time." However, understanding (a) the specific impacts of the alienations and contradictions of work and society under capitalism as well as (b) the analytic details of how the processes of learning are involved in the relationship of work experience and life course remain less well understood. An approached referred to as Mind in Political Economy is explained. It is based on a synthesis of several socio-cultural learning theories which allows the effective use of the concept of dramatic perezhivanie. This approach is then applied to a study of workplace learning in the context of a chemical production plant in Canada with a focus on the life history of one subject. It concludes that, based upon evidence of the realization of dramatic perezhivanie in relation to the contradictory object-motives of occupational autonomy/control as well as labour autonomy/control more generally, work-life learning in activity affected the quality of work experiences, the nature of development across employment history, and had carry-over effects beyond work. Moreover, it is shown that work-life learning could play a role in retrieving, reconstructing and making use of early life experience iteratively in the course of

biographical meaning-making through the creation and refinement of biographical artefacts across the life course by a process of double stimulation.

Keywords: *life course, work and occupation, cultural historical activity theory, epistemic culture, perezhivanie, double stimulation*

Introduction

According to at least four decades of life course researchers, experiences of employment have continued to play a prominent role in defining the broader patterns of the trajectories, transitions and turning points that make up the substance of the life course. Work and careers are "durable arrangements" that serve to "organize experience over time" (Pearlin, 1988, p. 259), directly shaping a broader sense of personal "mastery" (Pearlin, Nguyen, Schieman and Milkie, 2007) and even a sense of "regret" in later life (Schieman, Pearlin and Nguyen, 2005). As Mortimer and Shanahan (2003) argued, both subjective and objective turning points in the life course are disproportionately dependent upon changes in work and occupation. And, the "organized experience" of work and occupation offers, according to Moen (2016), a "basis for how we see the world around us, how we think about it and act toward it" (p. 262).

Implicated here are the legacy and carry-over effects of experiences at work. Central to these effects is the structural fact that, as Heinz (2003) puts it in his assessment of longitudinal studies of the life course and employment: "[n]egotiating a career confronts the biographical actor [...] with the problem that work organizations are mainly interested in processing, using, and regulating its members" (p.196). Such inherent problems, he goes on to say, regularly influence the life course by providing "limited opportunity for forming biographical meaning" (p. 192). It can be expected that such a limit, in turn, shapes the realization of learning and agency in the life course.

This paper is premised upon the types of conclusions summarized above, with additional attention to Heinz regarding the relationship between the inherent problems of work and biographical meaning. It starts, then, with the notion that researching the relationship between the experiences of work and the life course would benefit from a more

detailed interpretation of the inherent constraints of work. And so, in this paper, these constraints are explored as matters of alienation and de-alienation which revolve around what are known as the contradictions of power and control within capitalist political economy, culture and society (Marx, 1844 /1978). A set of classic, landmark empirical studies by Kohn (e.g., 1976) examined the matter in just this way:

> *[…] the conditions of work determinative of occupational self-direction—closeness of supervision, routinization, and substantive complexity—bear meaningfully on three major types of alienation—powerlessness, self-estrangement, and norm-lessness. […] There is carry over from occupational experience to alienation in non-occupational realms, and his carry-over is of the logically simplest type (see Breer and Locke 1965)—the lessons of the job are directly generalized to non-occupational realities. (Kohn, 1976, p. 127)*

These are the starting points of this paper. In it I focus on life course learning and its relationship to work through the integration of a combination of key concepts—activity, occupation and dramatic perezhivanie—under the rubric of what I will be referring to as a "mind in political economy" (MPE) approach. I explore how certain types of experiences within paid work can (a) play a powerful role at work over the course of an employment history, (b) can result in carry-over effects beyond work-life, and, can even (c) shape the recovery, reconstruction and use of past experiences in the course of which increasingly coherent biographical meaning can emerge, all of which places the notion of "legacy" effects in a more complex light. As has just been seen above, certain aspects of these dynamics are reasonably well understood, particularly in studies of the life course. Other aspects, such as those associated with understanding the main contradictions of work specific to capitalism on the one hand, and the in-situ activities and details of the processes of adult learning revolving around these contradictions on the other (i.e., the substantive dynamics that constitute the "lessons of the job") are much less so.

Thus, the aim is to advocate for an approach that may prove helpful in expanding understanding of how particular developmental experiences are likely crucial in explaining the relationship across early life and

schooling, work experiences and employment history, and life course development. To do this, I have organised the discussion into two major sections.

In the first, I describe the MPE approach. It is based on a synthesis of selected socio-cultural theories of learning that lays the basis for analysis. Oriented toward the primary contradictions of capitalist political economy, this specific approach is designed to support a more detailed analysis of two specific constellations of in situ activity—one rooted in the contradictions of the forces and the other the relations of production—which, I claim, reflect the limitations facing the biographical actor with greater clarity than is normally seen in studies of the life course. However, I also explain why the key to understanding the potentially transformative dynamics associated with each constellation of in situ activity is found through the application of the concept of dramatic perezhivanie; a concept developed to analyze the relationship of early life experiences, biographical personhood and in situ activity.

The second section provides an application of the approach. It takes the form of a re-imagining of empirical material from an earlier study; a study specifically chosen for its inclusion of work-life history data but also because it posed questions regarding the nature of work and the life course that, at the time of original publication, I simply could not answer. Specifically, I present a case study of work and learning in a chemical plant in Canada, at the centre of which is a life history analysis of a particular worker. Provided are information and analysis regarding his current work-life, employment history as well as early life experiences. His story is a type of success. And, I claim this success is dependent on how, for him, work, life course and learning come to involve sets of mediating occupational and trade unionism supports.

A 'mind in political economy' approach

This paper undertakes its analysis under a rubric that, elsewhere (Sawchuk, 2013), I have named a "mind in political economy" (MPE) approach. It integrates selected aspects of socio-cultural learning theory in order to shed light on the powerful relationships between political economy, paid work and the life course. It is designed to more thoroughly appreciate the dynamics of learning specific to the fundamentally alienating tendencies of life under capitalist work, culture

and society through which forms of de-alienation and resistance can also be better understood. Still too widely ignored or otherwise minimized in studies of work and the life course, a means of analytically attending to the many faces of human alienation at work and beyond, in detail, I argue, remains a necessity not only for its aspirational sentiment but for its concrete value in empirical analysis.

Specifically, this approach draws heavily from certain canonical and non-canonical traditions (Stetsenko and Sawchuk, 2008) of the Cultural Historical Activity Theory (CHAT). The many sub-traditions of CHAT's treatment of the mind contribute powerful tools—developed, quite literally, over more than a century—for understanding adult learning. Primers in these CHAT traditions are widely available and especially applicable to understandings of the MPE approach, more detailed historical (e.g., Leontiev, 1978) and contemporary sources (e.g., Engeström, 1987) are recommended.

However, as a summary, I point to the most relevant of core principles. In this approach, the basic, minimal meaningful unit of analysis of learning is in situ activity—that unit which expresses all the fundamental, concurrent, and mutually necessary features of real, living and changing human practice. In situ activity can be understood as a circumscribed set of interactive social, material and historical relationships. I say "circumscribed" because all relations and mediations of in situ activity are understood as organised by what is known as an object-motive—the governing forms of purpose(s) and meaning(s) of an activity, typically un-self-consciously appreciated by participants. Activity is further composed of the relations between self-conscious goal-directed actions as well un-self-conscious operations (practice adaptive to specific symbolic and material context). The circulatory system of activity, however, is tool/artifact mediation, i.e., through mediating tools/artefacts subjects affect the world, and vice versa. This is CHAT's theorization of the relation of subject and object.

Driving adaptations and transformations vis-à-vis in situ activity are forms of contradiction. Contradiction refers not simply to tensions, problems, or conflicts as such. Rather, drawing on a Marxist/Hegelian definition, it refers to a structurally distinctive relationship that is both mutually constituting and mutually undermining of its elements. In turn, the means through which such contradictory relations are

partially (or more thoroughly) resolved is conceptualized as a process of double stimulation (Engeström and Sannino, 2010; Sannino, 2015); a key concept originating in the work of Vygotsky that explains people's confrontation with and resolution of a contradiction through the substitution (or creation) of an alternative mediating artefact in activity, i.e.,

> *Instead of merely giving the subject a task to solve, Vygotsky gave the subject both a demanding task (first stimulus) and a 'neutral' or ambiguous external artifact (second stimulus) the subject could fill with meaning and turn into a new mediating sign that would enhance his or her actions and potentially lead to reframing of the task. (Engeström and Sannino, 2010, p. 5)*

As will be seen in the analysis to come, attention to changes in modes of participation in particular constellations of in situ activity, as understood in terms of double stimulation dynamics and the emergence of new 'biographical artefacts', will be important to the exploration of the iterative accomplishments in work and life history as a whole.

For an MPE approach, this set of core principles of CHAT must be supplemented in several ways. One of these involves the additional capacity to interrogate human agency and questions of social justice and political economic conflict (themes that still much CHAT research has struggled to consistently articulate). From an MPE perspective, this is an essential feature of explorations of in situ activity and learning, at work and across the life course. In the analysis that follows, I will show how conflict about occupational autonomy and trade unionism plays a role in this sense. Conceptually, however, here I am referring to an intensive theorization of the primary contradiction of activity (to do with alienation and the relationship of use-value, exchange-value, and valorization). Supplementing analysis in this regard then, is Stetsenko's (2014, 2017) theorization of activity which emphasizes engagement with the phenomena of social transformations aimed at greater social justice. According to Stetsenko, a Transformative Activist Stance (TAS) perspective allows us to explore the personal-individual and collective—or what she calls collectividual—orientations in terms of their distinctive relationship to the construction and existence of contested object-motives in activity.

A second supplement to the core principles I outlined above involves a

means of attending to the power of autonomous occupational culture and knowledge. For Marxist-inspired researchers broadly speaking, occupations are often viewed with scepticism as a source of obfuscation of class and power analysis as well as a feature undermining working-class solidarity and consciousness (e.g., Wright, 1980). And, on an entirely different basis, so too do many CHAT analyses of work minimize the conflictual class relations and the distinct forms of power and control that workers may exercise vis-a-vis occupational knowledge in favour of multi-occupational object-motives associated with organizational need and work systems as a whole. In an MPE approach, occupations are understood to have significant progressive relevance in understanding in situ work activity including its effect on the life course. In other words, it is posited that occupations (rather than only work systems or organizations as a whole) are a consequential feature of activity and agency in their own right. Because of this, there is a need to integrate insights from a socio-cultural analytic tradition of occupational research that focuses on Epistemic Practice (EP). Its unique contribution is that, as Nerland argues, EP offers unique capacities for understanding how culturally shared or collective knowledge provides occupations with a unique "integrative power" due to their ability to construct "collective identities and commitments" (2008, p. 52). Moreover, it is through this analytic lens that we may better understand how groups of workers may (or may not) instantiate the (epistemic) practices of "collectivity and control" at work (Nerland and Karseth, 2015, p. 11), for (see Kohn 1976 above) it is around questions of the experience of collectivity and control that broader effects on the life course revolve.

The integration of the above-mentioned socio-cultural traditions represents the foundation of the MPE approach. However, I claim that the realization of human agency in life course learning, at work and elsewhere, must also be understood as a deeply personal, dramatic lived experience; one based on shifts in personhood powered by a realization of deep, emotional engagement. Thus, the type of foundation I have just described is uniquely suited to the incorporation and use of a concept drawn from a founding contribution to CHAT in the earliest (and again in the much later) work of Lev Vygotsky. This concept is called perezhivanie. Likely the closest thing that the broader Vygotskian and the more specific CHAT traditions of research have at hand for a

conceptualization of learning, personality and biography over the life course—it is defined as the meeting point of context and a thoroughly historical, socialized and uniquely biographical personhood (Fleer, González Rey and Veresov, 2017).

More important still, for the argument of this paper, are the distinctive moments of perezhivanie, which are associated with the learning of transformative—or we might say, political economic—human agency, and with it, the learning of new transformative personhood as understood through the concept of dramatic perezhivanie.

> *Dramatic perezhivanie refers to the contradictory nature of human development—there is no development without conflict and drama. Those are refracted through dramatic perezhivanie (Veresov, 2019). Dramatic perezhivanie contains the potential to become a turning point in a [person's] development, it represents a short-term 'microsocial situation of development' and corresponds to the main characteristics of the macrosocial situation of development […]. (Sukhikh, Veresov and Veraksa, 2022, p. 3)*

It is not happenstance that the notion of drama, and indeed a theory of drama (with Vygotsky, very much influenced by Tolstoy and especially Stanislavsky), is implicated here. This implication is not merely metaphoric, but a matter of symbolically and materially mediated in situ activity, contestation of object-motives, shifts in modes of participation, double stimulation dynamics and so on. As Smagorinsky (2011) explains: "Vygotsky sees personality, with its psychological foundation, and art, with its dramatic origins, as interrelated: The development of personality is fundamentally dramatic and the phenomenon of art is at its heart psychological, suggesting the necessity of both in the development of consciousness" (p. 335). Put another way, the realization of dramatic perezhivanie requires developmental situations—a dramatic scenery—with both personal and contextual potential for transformation. It is in encountering such situations that there is the potential for the re-construction of an alternative personally-refracted "sense" (Leontiev, 1978) of one's life experiences, accomplished during in situ activity which, under certain circumstances, may become increasingly endemic to and definitive of the life course. Thus, in this approach dramatic scenery is defined by the appearance of features of

in-situ activity such as the following: (a) a conscious and/or unconscious apprehension of the notion of a trajectory of personal change (according to theorizations of drama: involving the construction of an archetypical character arc) linked with (b) a conscious and/or unconscious apprehension of contradiction (according to theorization of drama: the construction of protagonism/antagonism leading to a notion of conflict, rising action and the possibility of resolution, i.e., a first, second and third act structure). Taken together, these features are indicators, I argue, of the potential for a reconfiguration of modes of participation in a in situ activity involving the production of what Smagorinsky (2011, p. 337) calls "meta-experiences" which may result in the creation of the types of consequential 'biographical' artefacts that can be associated with various carry-over and legacy effects in the life course.

An MPE approach, then, can make very specific use of dramatic perezhivanie in the analysis of work and changes in the life course, biography and personhood over time. In the analysis below, I claim there is evidence of two key forms of dramatic scenery, reflecting primary contradictions under capitalism, which hold distinctly important potential for realizing forms of dramatic perezhivanie that may shape the life course. These define specific constellations of activity that revolve around contradictions of capitalist forces of production (explored here in terms of the autonomy of occupational knowledge and practice), and that revolve around the contradictions of capitalist relations of production (explored here in terms of conflict over the autonomy of labour in labour relations more generally). Indeed, the analysis I will present in a moment suggests that examined either together or separately, these experiences represent unique moments of activity when a multiplicity of contentious and potentially actionable object-motives revolving around class, alienation, and the possibilities of de-alienation surface most definitively.

Below I seek to demonstrate the value of this type of MPE approach through application. I argue it can be seen that the details of experiences at work, and its organization, matter in and of themselves, but likewise they shape the life course and biographical meaning-making, within and beyond work, both backward and forward in time.

Research design and methodology

The following empirical illustration is meant to ground a sense of the ideas introduced in the first portion of the paper through an analytical re-imagining of materials from research analyzed and published earlier. As mentioned at the close of the introduction, this material was selected largely because it posed questions that I simply could not answer at the time. Missing were the analytic means of interrogating extended features of work, learning, biography and the life course. Specifically, my analytical re-imagining is based on a funded research project, led by D.W. Livingstone, and reported in a monograph entitled Hidden Knowledge: Organized Labour in the Information Age (Livingstone & Sawchuk, 2004) which, going forward, I will simply refer to as HK. As reported at length in HK, the research was approved by the ethics board of the University of Toronto and was based on a five-year qualitative study of workers and workplaces in Canada. It utilized work-life history interviewing along with work-site visits in the context of a multi-case study (5) research design. The focus of the discussion below, however, deals with only one of these sites: a chemical production plant. A total of 20 workers were interviewed at this site. These work-life interviews with each worker were typically completed over two sessions, each session averaging 1 to 2 hours in length. Interviews were recorded, transcribed and originally coded for analysis organized around overarching themes of organized and informal learning at the workplace. In this subsequent review of the original data, additional themes were coded according to the principal elements of the MPE approach.

While there are points of analysis gleaned from the chemical plant data set as a whole, for this article the MPE analysis primarily revolves around only one worker whom I refer to as "John Carsons" (a pseudonym). The approach to the analysis below parallels that reported in González Rey and Martinez's (2017) study of dramatic perezhivanie, obesity and the life course which is also based upon the study of a single subject, with findings and analysis presented by way of a set of descriptive vignettes punctuated by direct quotation.

Findings and analysis

Beginning with unions, occupations and learning at a chemical plant

I begin with the overall labour relations context as well as general insights about work and learning dynamics at the plant, before initiating analysis of the work life history of John Carsons. As reported in HK, this study provided a great deal of evidence and analysis of work-based learning activities. The evidence included information regarding the impacts of (a) an energized and proactive local trade union culture operating in parallel with (b) certain areas of highly autonomous occupational culture.

Buoyed by unusually high levels of educational support provided at the union's national level, the militant local union culture at the chemical plant was linked to charismatic and experienced local leadership. Not coincidently, this leadership group emerged following a dramatic strike by the workers less than a decade before the beginning of the study. In re-imagining the original analysis, it now seems unproblematic to conclude that elements of dramatic sceneries, affording agency in learning lives, based on a dramatic framing of oppositional labour relations, were plentiful. That is, the experience of the labour strike consistently informed virtually all the interviews with workers. What is clear now and un-remarked upon in the original analysis is that these accounts were consistently framed with an array of archetypical protagonists and antagonists as well as tragedy or triumph. There were passionate explanations of worker rights, the problem of managerial control as well as details concerning what could have been done differently, contrasted with celebratory explanations of what was achieved through the strike in terms of a general sense of solidarity amongst workers (despite the strike being broken and workers being forced to return to the collective bargaining table). There is more than enough evidence, in other words, of the potential, not infrequently achieved, of a "sense" (Leontiev, 1978) of agency—both realized and potential—in learning lives associated with dramatic scenery related directly to the broader aura of labour union action.

Beyond the drama and developmental potential inherent to labour relations conflict as such, equally important were experiences of over-credentialization/under-employment in batch production which

made up the majority of operations at the plant. Here, accounts in the interviews of work activity being rigidly controlled and supervised, with relatively low levels of worker engagement were typically seen in the data. Side-by-side with these units, however, was what was called a "high-production" department which was seen by both workers and management at the time as an opportunity to demonstrate what increased worker autonomy and control at work could do for the company's quality product as well as its financial prospects. The side-by-side nature of these distinct sets of in situ work activity produces for us a naturally occurring experimental design of a type; a comparative assessment that can help us better understand the profound contribution of occupational autonomy, as well as trade unionism, on in situ activity and broader dynamics of lifelong and life-wide learning.

For a better understanding of this and more, we can now turn to the central figure in the discussion, John Carsons, a man who had worked in both the batch and high-performance production units. In these terms, it can be said that, for the batch production units, as John himself commented, "The work is simple. Maybe too simple" or as he also called it, "idiot-proofed." Like others, John said this lack of worker autonomy generally led to problems for both the company and the worker, i.e., issues of low quality and productivity as well as disciplinary problems and substance abuse.

However, for the high-performance department, the organisation of in situ work activity featured persistent opportunities for the use of skills, learning and judgement in the course of work. Even beginning with John's initial description of it below, there is a detectable romance and heroism of knowledge and knowing, further laced with a sense of oppositional drama of triumph (of hard-won experiential knowledge of workers versus formally recognized knowledge of company engineers, and so on).

> *Everyday is learning in my department. I changed the set-up for the de-bugging. All the "professionals" [i.e., engineers; placed dismissively in air-quotes by John] were out there, but nobody questioned how they were going to de-bug the machinery when in production. It's really about the autonomy of the department … They're too focused in their area [compared to] when you've had years and years of experience.*

Now, in the form of a slightly lengthier vignette developed based on the work life history interviews with John, less is left to the imagination. In terms of a theory of in situ activity, John's needs have met with two object-motives capable of energizing action: one associated with the relations of production (via trade unionism) and the other associated worker knowledge understood as an element of the forces of production (via epistemic culture of autonomous occupations).

> *After a lengthy and varied employment history, John would eventually take the first of several jobs in the chemical industry. Working for a few different companies over the subsequent 12 years, John described applying his learning abilities and "learned to survive" in workplaces where company's, quite literally, "used to try to get away with murder." While working in the chemical industry John described developing asthma and came to fear for his future health. He describes continuing to learn the lesson of the need for "street-smarts," along with a strong union, first taught to him in earlier work-life on the shipping boats in the great lakes of North America.*
>
> *At the present chemical factory, John started at low-skill jobs (e.g., batch production unit, removing labels from cans). But he describes riding the corporate wave of enthusiasm for developing a more "self-directed workforce" with more "team-based work," and he ended up in a newly created "high-performance," advanced production department of the plant. With extensive training opportunities in quality processes, health and safety, and company support for on-the-job training initiatives, John describes great enthusiasm for learning opportunities, as well as a confidence to affect positive change in production processes across the department. Importantly, John says, the workers in his unit "call their own shots. […] We get a dollar more an hour, but the main attraction is we get real autonomy."*
>
> *John excitedly recounts a recent experience in which the team has developed its own "paste library" (a catalogue of quality tests on incoming materials) to monitor changes in the supplier quality. He talks with pride about how his team had corrected company engineers on machine set-ups.*

Thus, in an analysis of data as it relates to in situ work activity and object-motives, I argue the side-by-side existence of both lower skill and lower autonomy batch processing on the one hand, and the high-performance department on the other, helps us understand the significance of John's own experiences. The object-motive associated with batch production is governed by a strict separation of design and control on the one hand, and execution on the other which, beginning with Braverman (1974), has been associated with 'de-skilling,' disempowerment of labour and alienation. By contrast, the governing object-motive of high-performance department work is occupationally epistemic in nature. As evidenced by autonomous work of de-bugging machines while in operation or, more dramatically, in the workers' independent creation of a 'paste library' of supplier material—much in situ activity is organized by the creation and expansion of autonomous occupational skill, knowledge and judgement.

As summarized at the outset, the insights from researchers of the life course, with special attention to Kohn (1976) specifically, would suggest that either set of work experiences discussed above would have carry-over effects beyond the workplace. Whether or not and how such is the case (and how early life experience may also be involved) are issues I turn to now.

Carry-over and legacy effects, early life and dramatic perezhivanie in work and the life course

According to Coelho-Lima, Varela and Bendassolli (2021): "[i]nformation on the individuals' life path, their previous experiences, and their motivations for choices, on the one hand, and their current living conditions on the other, are fundamental to understanding perezhivanie—dramas concluded and their effects on individuals" (p. 165). Thus, now I reach beyond John's current work as well as further back in time with another vignette of John's life history. In it, we obtain a glimpse at the broader and deeper context, and specifically, I explore possible evidence of dramatic scenery occasioned across his employment history as well as in his early life.

> *Born into a fishing community in the Canadian east coast, with poor employment prospects it wasn't long before John Carson's father moved his family to Canada's largest city, Toronto. There*

they settled into an attic apartment in a working-class district of Regent Park; a neighbourhood full of east-coast Canadians like themselves as well as new Canadians, mostly Italian and Portuguese immigrants at the time. A former British Navy military man, John's father was a stern disciplinarian and a hard drinker, both of which weighed heavily on the household. To escape, John spent a lot of time "running the streets," and as he describes going through high school, he remembered distinctly how many of his friends ended up in trouble with the law.

John would, however, successfully complete high school with a genuine fondness for, he said, "of all things, chemistry." However, that same year his father suffered a debilitating heart attack and was permanently disabled. With no financial support in the household, John describes how he was forced to abandon his plan for further school to search for paid work. Thus, by the time he was 17 years old, he spoke of "his most important lesson", namely that he had to find a way to get out "to survive": "I said there's no way I'm going to be living like this. I'm going to turn my life around, but I've got to do the turning around." He describes how his father's drinking contributed to his sense of the need to take control of his life: "The one thing you have that makes you equal to everybody else is your willpower. If you don't have your willpower, you got nothing."

Sending home paycheques regularly, John travelled the long length of Canada working in a variety of jobs through his twenties and thirties: as a miner, a labourer, later, as a simple scullion on the giant shipping boats in Ontario. It was on the lakes that John says he got his first taste of trade unionism, and he describes learning avidly about the history of the Seafarers International Union. It was on the lake boats that John describes learning the way he likes to learn best: by working side by side with experienced seamen, watching and doing:

You have to learn things by doing it, you can have the book beside you, but you have to get your tools and do it. I tend to do good in school settings but I don't retain it. Informal stuff, when

> *you're actually learning at your own pace and learning things that you actually want to learn, you tend to retain, once you see something it tends to stay there, but the whole thing is you got to be interested, and you've got to be able to use it.*
>
> *It seems clear that the lessons John described learning in his work life cross the boundaries between home and work. At home, John is constantly learning about new things. He has taught himself and does his own electrical and plumbing work for home renovations; he attends sessions at the local building supply centre on how to do home projects (he had just built an enormous outdoor deck and patio in his backyard with the help of some friends from work); and, he's actively learning about the stock market. He teaches himself about "micro and macro-economics." In the future, John says he wants to write poetry about his experiences. He plans to attend a local college course in the Spring.*

Worth noting is the fact that the coherence of accounts of the life course is indicative of achievements of biographical meaning. Thus, even drawing upon the most basic elements of life history research interpretation (Chamberlayne, Bornat & Wengraf, 2000), based on the coherence of John's descriptions across his early learning life, employment history including the details of in situ activity in his present work at the chemical factory as well as his reports of interests and plans outside of work, there are insights to be gleaned. Although a lack of detail in the original HK data makes a full analysis of in situ activity in early life unavailable, it does seem to suggest that forms of consciousness and aspects of personality [as well as what psychologists speak of as 'hot' and 'cold' executive function, e.g., Sukhikh et al. (2022)] were shaped by early life experiences. My claim, however, is that there are also clues that lessons from youth have a more complex relationship to work-life and the life course than might be apparent at first blush and that this is not merely an effect of the life history interview situation itself (or even the tendency for people to reinterpret their past based on their present in general).

An important part of this claim involves the relationship of John's narrative with his realization of biographical meaning. This is important given that, as we learned earlier, limited autonomy and complexity

as well as barriers to the development and use of knowledge, skill and judgement within the typical capitalist labour process tend to undermine the basic capacity for biographical meaning-making more broadly (Kohn, 1976; Heinz, 2003).

While early developmental experiences matter in themselves, I argue that they likely would not have been reconstructed in John's narrative so coherently — demonstrating biographical meaning-making — were it not for a string of specific work-life activities. To understand the matter better, what is needed is a more dialectical appreciation of the past as having developmental potential and the subsequent moments of life playing a crucial role in its realization, in this case through artefact creation, i.e., that process described earlier as double stimulation. There is in this sense a creation of a special mediating artefact; one rooted distinctly in dramatic perezhivanie; and through this, one uniquely capable of generating meta-experiences that re-synthesize and make new uses of the past to allow its potential—even that found in harsh conditions, as in the case of John's early life—to develop. Thus, further to the evidence of broader carry-over effects beyond work currently, the relationship of John's early life experiences and his subsequent work-life should be understood as a deeply and ongoingly iterated series of realizations of dramatic perezhivanie, likely experienced as a young person and according to the evidence more assuredly experienced as a working adult.

Specifically, the evidence suggests that, for John, a string of in situ employment activities—regularly and likely increasingly punctuated ever more coherently by experiences of dramatic perezhivanie—nurtured an emergent narrative. A created and then iteratively refined form of biographical artefact contributed a powerful mediating effect in his mode of participation in certain in situ activities which, in turn, generated a broader and more far-reaching trajectory of development. The data suggest this is likely the case when he was a scullion on the lake boats as well as when he arrived at the chemical factory (where a link to his father's work life history in the British navy can be noted, and more importantly so too is it relevant that he developed asthma which may have played a role in recovering further aspects of his early life survival narrative as well).

Most importantly are the following points. John encountered

opportunities for (a) occupational autonomy as well as (b) more generalized labour autonomy associated with militant trade unionism, each offering an agentive and de-alienating alternative to the contradictory object-motives of work. Each context, in other words, afforded him a parallel and mutually supportive set of dramatic sceneries. Features of dramatic scenery that I have put forward (e.g., personal sense-making regarding archetypical character arcs as well as contradiction, rising action, and a vision of resolution) were made increasingly apprehendable to John vis-à-vis the mediations of an iteratively developing biographical artefact within in situ activities. Such affordances, I argue, can be associated with what I have called "object-work" (Sawchuk, 2013, p.292): a reconfiguration of object-motives capable of launching new forms of action as well as new iterations of personhood through experiences of dramatic perezhivanie.

Conclusions

> *People frame and interpret their experiences through interdependent emotional and cognitive means, which in turn are related to the setting of new experiences. The phenomenon of meta-experience—that is, how one experiences one's experiences—provides the means through which people render their socially and culturally situated activity into meaningful texts of events. [Thus, Vygotsky's] relation of imagination, emotion, and cognition suggests that people's capacity to project a trajectory for themselves is culturally mediated. It is important to understand, then, the kinds of mediation that provide both the emotional foundation and cultural sense of propriety for their trajectories, and the sorts of mediation that potentially limit conceptions of trajectory. (Smagorinsky, 2011, pp. 337, 339; emphasis added)*

In his discussion of the dynamics of perezhivanie, Smagorinsky's explanation of "limits" is relevant in as much as John's learning and life course demonstrates biographically iterative processes of overcoming them. Even more relevant may be Smagorinsky's reference to "meta-experience" which, as I mentioned above, suggests the notion of biographical meaning vis-a-vis the construction of a type of consequential and durable mediating biographical artifact.

Thus, while recognizing the need for caution against overgeneralization, this article has offered an alternative approach to understanding life course learning and its relationship to work. This approach was drawn on to posit and then (a) explore the role of the alienating features of the primary contradictions of capitalist work revolving around the relations of production and the forces of production, by (b) using a robust and specific system of analysis of human learning itself. It helps fill holes in the literature in these two ways. In applying this approach, it could be seen that certain constellations of in situ activity affected the quality of work experiences, and the nature of development across employment history, and had carry-over and legacy effects beyond work. And, in the last segment of the analysis, I also argued that the character of work-life learning experiences plays a role in retrieving, reconstructing, and making use of early life experience in the development of biographical meaning in situ.

The primary contradictions facing workers, understood here as alienating structures of work, I argue offer defining opportunities for sustaining constellations of in situ activity, but only if these constellations, at some point, benefit from the realization of a certain organization of symbolic and material mediations, allowing the engagement in "object-work" (Sawchuk, 2013). These opportunities also have a relationship with the subject's early life growing up in the context of poverty and parental alcoholism in 1960s Toronto (Canada). I claim that John Carson's agentive history of experiences of work and occupation, dependent upon the realization of dramatic perezhivanie, came to function, over time, as an increasingly governing feature of his past as well as present and future. In other words, in John's case, employment history played a significantly powerful role in defining the life course. An accumulation of specific types of learning experiences not only produced legacy effects and carried over to the quality of his non-occupational learning life, but they also helped to refine and elaborate a particular sense of biographical meaning iteratively, connecting his past and present in new ways, which in turn suggests positive possibilities in the future of his life course.

Invaluable as they are, current research on the relations across work, learning and the life course need analytic tools more capable of deepening and further specifying the nature of the overarching dynamics they have otherwise often correctly identified. Based in part

on the types of insights offered here, in response I am advocating for the adoption of an MPE approach that forefronts the constraints on and opportunities for meaning-making in the life course as matters of alienation and de-alienation rooted in the contradictions of power and control within capitalist political economy, culture and society.

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Workplace practices that support learning across working life

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In an ever-changing world of work, workers are expected to maintain currency of changes through lifelong learning to sustain employment and transition into new jobs or occupations - as the need arises. Adult workers rely on affordances from societal, workplace, community and educational institution sources that offer opportunities - intentional or sometimes unintentional. Productive engagement in these opportunities leads to positive outcomes in terms of learning and employment, although adults' personal epistemologies, agency, and intentionality determine which affordances they engage with, in what ways, and for what purposes (Billett, Choy and Le, 2023). Moreover, working age adults' learning is largely and necessarily premised on their own constructive efforts albeit with guidance from those with whom they work closely. According to the Organisation for Economic Co-operation and Development, the working age population is defined as those aged 15 to 64 (OECD, 2023). In Australia, the working age can be extended to 74 (Australian Bureau of Statistics, 2023). Working age adults' worklife learning is sustained through permutations of lifelong learning and lifelong education that enables them to navigate

different kinds of transitions that may arise due to institutional or personal factors such as life stages, employment status, occupations, re-locations, health and personal preference or trajectories (Billett, Choy & Le, 2023). This means that lifelong educational provisions need to extend beyond those from educational institutions to include experiences in workplaces and the community. The growing realisation of the potency and importance of learning experiences in workplaces and other social settings is now attracting a greater consideration of these sites for ongoing learning of working age adults. This calls for learning in the course of everyday work to be acknowledged and systematised around work practices.

In this paper, we illuminate and elaborate on workplace contributions to learning that support individuals' employability across working life. Drawing on the worklife history interviews (n=66) and a survey (n=678) data from an Australian Research Council funded project [DP 190101519], we report and discuss working age adults' perspectives of workplace affordances. The findings from the interviews indicate that three work-based models suggested by Billett et al. (2016) are most appropriate for supporting workers' learning in their work settings. These are wholly work-based experiences, work-based experiences with direct guidance and work-based experiences with educational interventions. The affordances and practices of workplaces are central to supporting workers' lifelong learning in workplaces, but they also need access to lifelong education provisions to maintain currency of knowledge and skills to sustain employment.

***Keywords**: workplace learning, lifelong learning, lifelong education, work transitions, work-based experiences, work-based learning models*

Lifelong learning and lifelong education

Permutations of lifelong learning and lifelong education enable workers to sustain continuance in learning when negotiating and navigating occupational and workplace transitions to maintain productive working lives. The notion of 'lifelong education' and 'lifelong learning' is often misconstrued and the terms are erroneously used interchangeably

(Searle, 1995). Lifelong education is described as an institutional objective, where the provision of experiences is designed to serve its educational purposes. Programs and the relevant curriculum are specifically designed to achieve defined learning outcomes. Lifelong education can include intentional and unintentional programs or experiences, whether as part of programs by educational institutions or other forms of provisions that adults can access and engage in. Lifelong learning refers to learning across the course of the working lifespan, whether within a single occupation or for new and emerging occupations. In this way, lifelong learning serves person-specific goals and can be sourced outside the provisions by educational institutions (Billett, 2009) in workplaces or the community.

Worklife learning comprises what is provided and afforded by educational institutions as intentional education programs and experiences (Billett, 2009), and what individuals access and mediate from other sources such as workplaces, communities, and social and online spaces. Adults learn through educative experiences designed to guide, assist and support engagement in activities and interactions, either directly or indirectly. Such experiences (intentional or unintentional) assist in learning the practices of particular communities (Gherardi, 2009) like those for particular occupations or vocations. In most cases, learning that does not constitute lifelong education (i.e., provisions of educational institutions) is less privileged even though research (e.g., by Eichinger & Lombardo, 1996) shows some 70% of learning arises from experiences in the workplace, 20% from interactions with other and only around 10% from formal courses. The 70:20:10 model refers to work-related learning that workers can apply immediately.

In essence, it is the combination of lifelong education and lifelong learning that enables workers to navigate between employment, unemployment and retirement (Choy & Le, 2023), though how individuals view these provisions and their efficacies for working lives may vary across gender, age and cultural/ethnic backgrounds (Billett, Le & Salling-Olesen, 2023). Moreover, lifelong educational provisions need to consider the nature of transitions that adults encounter and how their learning in the workplace, for instance, can be supported to maintain currency of knowledge and skills to sustain employment.

Much of the continuing learning for work takes place in the context of work, in work settings – both physical as well as virtual spaces. It is the interactions in intersubjective spaces that enable learning. So, workplace learning is not restricted to the physical setting, but rather the intersubjectivities that translate into learning.

Transitions in working lives

Transitions in working life arise from institutional or personal factors such as changes in life stages, employment status, occupations, re-locations, health and personal preferences or trajectories. According to Smith (2023, changes require adults to negotiate pathways for transitions into alternate work arrangements. Billett, Choy and Le (2023) explain that transitions are mediated by individual agency, through educative support and affordances by institutions, workplaces and communities. At the individual level, it is their capacities, personal needs, ambitions and chosen trajectories that drive how adults secure and engage in learning to navigate transition. Educative experiences that are intentionally designed to support learning allow adults to prepare for current and emerging occupational requirements. Beyond the workplace, it is the family and familiars, and ethnic/cultural affiliates that extend opportunities. Then again, adults also have their own personal curriculum, comprising their unique life experiences that form a foundation to enrich knowledge and understanding (Billett, 2023). Given such a wide scope of sources for learning, it means that the learning curriculum exists beyond just what is intentionally designed by educational institutions. Regardless of the source of learning, the quality of guidance, support and assistance is crucial in terms of meeting lifelong learning aspirations.

In summary, positive outcomes of lifelong learning and lifelong education hinge on the affordances from societal, workplace, community and educational institution sources that offer opportunities that are intentional or unintentional. The opportunities afforded, guidance and support provided may occur by happen chance (Billett, Le, Choy & Smith, 2021). However, the level of success counts on the agency of the individuals in securing, accessing and engaging in the opportunities because it is they who decide on their intentions, and how they will engage.

Role of workplaces for ongoing learning

There are many benefits of learning based in the workplace. These include securing employment; remaining current and employable; advancing careers; changing occupations or careers; bringing about workplace change/innovation; and realising national economic and societal goals (Billett & Choy, 2012). This kind of learning provides workers with a more holistic development path when compared with the curriculum provided by educational institutions. In workplaces, practice-based approaches to professional development and continuing education and training are becoming more common (Billett, 2010; Frost et al., 2010). An emerging body of empirical research (see for example Eraut, 2007; Billett, 2004, 2009; Fuller & Unwin, 2011) offers convincing evidence on the efficacies of workplaces as a learning site. This research has awarded greater legitimacy to the efficacies of workplace learning (see Tynjälä, 2008, 2013 for review). Affordances for learning in the workplace are materialised by the norms, forms and social-cultural practices in the physical and social circumstances of the site, albeit may be contested by those who have worked in a workplace longer or even those who hold more senior positions.

The kinds of opportunities and support can vary. Some workplaces provide opportunities through continuous training and professional development that may include different kinds of learning strategies such as coaching, mentoring, job rotation, action learning, special projects, peer support, acting roles, or structured training. Certain kinds of affordances are in place to meet regulatory requirements, registration, certification or compliance while others are more discretionary. The provision of structured training could be in-house, delivered by internal trainers or outsourced to external trainers. Working across sites of the same organisation may also be available. However, all these provisions need some form of guidance. Billett et al. (2023) propose seven considerations to support workers' learning. These are:

1. Understanding the personal curriculum of individuals: Knowing the intentions of adults and their purpose of learning can inform the kinds of opportunities they most require.
2. Offer of continuous training and professional development: This has benefits for workers as well as the workplace in terms of maintaining currency of knowledge and competence as a way of

sustaining productivity.

3. Opportunities to work across different settings: Workers who gain experiences in more than one site not only expand the scope of site experiences but also have a better understanding of whole of organisation operations. This also makes them more flexible to stand in if there is a need for extra help at a particular site.
4. Rotation of work roles or engagement in different kinds of work: Such opportunities expand capacities in different roles.
5. Engagement in an educational program to upgrade knowledge and skills: Enrolment in educational programs allows workers' learning and experiences from different sources to be recognised and certified.
6. Allowing workers to practise a high level of discretion to enhance decision making and risk taking.
7. Progression into more senior roles: These opportunities form an integral part of preparations for career planning and development.

The list above includes the inclusion of expansive and restrictive learning environments recommended by Fuller and Unwin (2011). These considerations imply that a broader set of opportunities to participate enables extended development experienced by workers (Billett, 2001). However, the efficacies of learning in the workplace are optimised when augmented with direct guidance or educational interventions.

Billett et al (2016) suggest three models of continuing education and training associated with workplace provisions:

1. Wholly work-based experiences where workers learn through everyday tasks and interactions. They learn on their own or through support from more experienced co-workers.
2. Work-based experiences with direct guidance. This involves individuals' learning at work supported by the direct guidance of more experienced co-workers or supervisors, through joint work activities and engaging in supported activities for learning that cannot be acquired without the assistance from more experienced workers.

3. Work-based experiences with educational interventions where some form of structured learning is required. The interventions combine learning undertaken through workplace activities supplemented with structured learning tasks that may contribute to formal credits.

The benefits of learning in the workplace contribute at an individual level as well as organisational level. For individuals, it means staying relevant by identifying emerging changes, staying updated, and getting ready for the anticipated future. That is, preparing for the unexpected – changes in the nature of work and changes in employment status. Continuing learning enhances their profiles and extends the scope for new opportunities. They build confidence and generate new ideas that improve productivity and efficiencies. For organisations, it means workers will have the knowledge that is most relevant for work. There will be cost savings from the recruitment of new workers. That is, it is more cost effective for organisations to retain existing employees by supporting their learning and development than hiring. Notwithstanding the considerations suggested above, it is important to understand workers' perspectives of workplace learning and affordances to appropriate the kinds of provisions that are most effectual. This was the focus of the research reported below.

Workers' perspectives of workplace affordances: an Australian investigation

The findings described and discussed in this paper derive from an Australian Research Council funded project about promoting employability of working age Australians. The research project specifically examined how their learning arises across and through working life and how it can be supported more effectively through work activities, education provisions, and other forms of mediation and guidance (Le et al., 2023). The project comprised a three-phase process using a combination of qualitative and quantitative procedures in the gathering and analysis of data. These processes included: i) worklife history interviews with Australian working-age adults (n=66) to secure retrospective accounts of worklife learning, ii) survey to gain perspectives from a broader population (n=678) of their worklife learning, and iii) dialogue forum and discussions with relevant stakeholders to consolidate findings and generate specific

policy practice recommendations. The sample was recruited through industry and workplace contacts and the networks of the research team. Participants were required to meet a set of criteria that included having a range of roles in public and private sector workplaces. The selection of participants also considered a balance between occupational classifications, age and gender. Some were selected based on having experienced significant changes in their occupations, workplaces or life circumstances (e.g., changing countries due to political circumstances). Essentially, the participants would have a range of work life and learning experiences and outcomes. The background demographics of the interview informants and survey respondents are summarised in Table 1. Overall, the participants were well represented across different criteria such as gender, occupations, culturally and linguistically diverse (CALD) backgrounds, and experiences of 'old economy' and 'emerging economy'.

Table 1 Background demographics of 66 interview informants and 678 survey respondents

		interviews	*survey*	
Variable	**Value**	**N**	**N**	**%**
Gender	Female	30	438	64.8
	Male	36	234	34.6
	Not specified	4	4	.6
Age	≤19	13	13	1.9
	20-29	13	67	9.9
	30-39	15	159	23.6
	40-49	21	146	21.6
	50-59	10	182	27.0
	60+	37	108	16.0
Identified as	Aboriginal and/or Torres Strait Islander	8	106	15.7
	Australian born (non-Indigenous)	10	276	40.9
	Migrant from English background	30	177	26.2
	Migrant from non-English background	36	116	17.2
Highest qualification	Junior secondary school	1	27	4.0
	Senior secondary school (i.e., year 11 and 12)	2	53	7.9
	Vocational certificate	0	82	12.1
	Diploma/Advanced Diploma	24	100	14.8
	Bachelor Degree	16	172	25.5
	Postgraduate Qualification	24	241	35.7

From detailed work history interviews in Phase 1, it was possible to identify changes that initiate, shape and represent transitions that working age adults needed to negotiate across their working lives, comprising those associated with life stages; employment status, occupations, location, physical and psychological well-being, and lifestyle (see Billett et al., 2021). During these transitions, employability was the key concern, including the requirements for work, how they had transformed, and the kinds of learning needed for employability and how these had arisen through everyday workplace activities and interactions; and processes of guidance and support, including educational interventions. In addition to experiences in workplaces and learning of different kinds, the informants reflected on a range of societal, workplace, educational and personal practices that have

assisted them in securing learning across their working life to sustain their employability. These were then consolidated to formulate the survey in Phase 2 to further elaborate and augment these outcomes. Then, how worklife learning promotes employability was advanced in Phase 3. This included consolidation of findings, drawing out deductions, addressing the concern about enhancing learning activities in workplaces and tertiary education and generating specific practice and policy recommendations for educational institutions, workplace and governmental considerations. This paper draws on data from Phases 1 and 2, and the following sub-sections elaborate workplace contributions to individuals' learning that supports their employability across working life. They report and discuss working age adults' perspectives of work-based experiences, workplace affordances, and recommended practices for workplaces to enhance and sustain workers' learning and employability. Pseudonyms are used in the narratives of the informants' worklife stories.

Work-based experiences

The informants reported different kinds and domains of knowledge to sustain employability across their working lives. Different combinations of workplace experiences and educational provisions are needed at different transition points to support and guide that learning. Those kinds and combinations of experiences and support varied across different informants as they came to engage in those experiences and utilise the available supports to realise their learning. The Phase 1 findings suggest that the models of continuing education and training, proposed by Billett et al. (2016), form the foundations of what might comprise an education system that can assist workers in sustaining their ongoing development and employability, and promote the changing skills requirements for transforming productivity requirements. The models associated with work-based experiences comprise: i) wholly work-based experiences (i.e., on-the-job), ii) work-based experiences with direct guidance (e.g., mentoring, demonstrating), and iii) work-based experiences with educational interventions (Billett et al., 2016).

Wholly work-based experiences

Many informants reported that the ability to participate and undertake work tasks is the key factor that supports their learning. However, a

combination of educational provision and practice-based experiences is necessary for significant positive occupational transitions. Overall, the key locus for the learning and development of this kind arose through one's own efforts and intentionality.

Salim, for example, reports that he is constantly and actively seeking to learn from opportunities that arise from those around him. He provides the clearest examples by reporting how he learnt and continues to perfect his English, and also through observing and imitating what other workers in the construction industry did. He also refers to similar practices and learning how to be a businessman and run a coffee shop with the highest level of profitability. So, it seems that he is an energetic and intentional learner, and those intentions are driven by imperatives that are very close to him. Initially, these were about survival and about satisfaction, a sense of self and personal well-being. Yet, along the way when there have been significant occupational transitions, not surprisingly, in the two most extreme examples (i.e., becoming a builder and opening a coffee shop), these have been realised through a combination of educational experiences and opportunities to practice, because both of these required not only the learning but certification of it.

Danim was engaged in doing a lot of the work just by observation, imitation plus trial and error. He reports that his learning was supported by engaging with those around him who are trusted and respected (i.e., parents, brother and sister) and also some others he encountered in his work life. There was a range of situations provided through educational provisions (i.e., incomplete TAFE program in business management paid training with an experienced contractor) – that assisted his learning associated with customer service marketing in his grocery shop and then technicalities associated with the NBN rollout work.

For Ingrid, there is a consistent pattern similar to Salim and Danim's throughout her occupational transitions, which included an educational provision of some kind. She acquired a wide scope of occupational knowledge through a combination of educational activities and 'winging it' - haphazard trial and error. It is noteworthy that on at least two occasions she found herself engaging in work which was uncongenial (i.e., travel agent and real estate agent), both of which required relatively low level of entry level qualifications and were quite individually

focused. Her efforts in utilising her studies, seeking out employment, positioning herself in businesses, opening a shop and then converting a home into a student residence are all indicative of an agentic individual who is active both in terms of learning and worklife trajectories. In this way, much of the informants' learning across their working life, including initial occupational preparation, and continuing development arose through wholly practice-based experiences.

The agency of the learner in work can also be complemented by their activeness as a guide or supporter of co-workers. That is, learning through wholly work-based experiences can emerge from the need to teach and or support others. This becomes a source of learning. To successfully support others' learning can be a source of learning. Nathan reports learning a lot about the nature of the government department he worked in for a time, its cultural practices and how these practices impacted his employability through supporting co-workers to prepare and write successful applications for promotion.

Work-based experiences with direct guidance

Interestingly, workers claim to learn mostly through their own efforts first before seeking assistance and guidance from supervisors or other workers. This is consistent with the Australian PIAAC data (OECD, 2013).

In our study, eight informants report that they were afforded training, assistance or support for occupational development. A basic qualification for entry into the role was not required in most cases. There was a combination of experiences on the job and educational provision of some kind for certification by these workplaces. As such, the employees can learn about their work roles as they are engaged in tasks and receive support at work.

John left high school at the age of 16 and did not gain any formal qualification. By learning on the jobs, he was able to establish a successful career in logistics and inventory management, working mainly for large natural resources companies as a fly in- fly out (FIFO) worker to remote locations. Most of his roles are contracts or fixed-term assignments, which he sourced himself through his networks or was referred to or headhunted. He started his first paid employment in his father's business (scuba diving retail), thus entering the workforce as a

novice and being guided and mentored by his father. The learning in this job led him to a larger company of its kind, taking up a more senior role as a warehouse manager, where he developed further skills by learning from others (through a buddy system) and by self-learning. This became a consistent approach to learning for John in later roles and importantly afforded him to transition successfully across various roles.

On-the-job learning alone does not always result in a successful transition. This happened to Anastacia. At one stage, Anastacia was employed as a Property Surveyor. Despite having a degree in economics and business, she found the role challenging as she did not have any formal experience or education in risk and asset assessment. She utilised some of her finance knowledge evaluating assets and their depreciation. She was not prepared or trained for that role, but she managed by drawing on past knowledge and experiences. Yet in another role, as a research project coordinator, Anastacia received support from peers who either performed certain tasks that were required for the project or taught her how to complete certain tasks. There was no formal training provided given that she joined halfway through the project. She was exposed to various staff development opportunities where she learnt and developed other skills (e.g., using statistical software programs). At one of these events, she met a facilitator who encouraged her to pursue her career and studies in data science. It is evident that whilst much learning across working life occurs through practice and is largely mediated by the learner's efforts, there are still circumstances in which engaging proximally with more expert or experienced others is essential. These particularly appear to be the case when knowledge that is difficult to learn or access is required to be learnt.

Work-based experiences with educational interventions

Apprenticeships stand as a good example of this kind of learning. That is, supported by expert input from trainers either on- or off-site, or using projects, such as action learning, to extend this learning and enhance practice aspects of work. The learning is often accredited and leads to certification.

Depending on the nature of the occupations (e.g., those associated with the healthcare and support sector) on-going training and continuing professional development to upgrade skills and knowledge of the work is

mandatory for individuals to sustain their employability. Learning may be provided by internal and/or external providers. The employees are expected to exercise bounded agency, working within sets of parameters associated with the sector in which they are employed. Marcy (a healthcare worker in a nursing home), Annita (a healthcare worker in the disability support centre), and Linda (a nurse in a medical clinic). These workers are required to attend regulatory training and meet the compliance requirements at their workplaces. Their learning is afforded by their workplaces and delivered by external training providers. Apart from Linda, whose nursing qualification is essential to enable the transition, others are encouraged by their employers to undertake educational programs to gain appropriate qualifications to sustain their employability. So, Marcy, at a certain stage of her career, completed a Certificate IV in Aged Care and Community work. Annita, after two years of working for her employer, completed Certificates III and IV for disability.

In another workplace (not healthcare), James was provided with a structured learning experience at one of his workplaces, the cardboard box manufacturing company. As a trainee, he was provided with an apprenticeship-like preparation in this company. This included being rotated through all of the production areas within the company, and then in the design area and also with a stencils and printing section. When he moved into the sales section of this workplace, his learning was also scaffolded. He commenced working on the phone with existing customers (internal sales) to engaging with new customers and then eventually becoming a sales representative. He was offered a car and a set of clients but was required to achieve particular monthly budgets. Similarly, as an assistant designer, working in the design room as a pattern maker, Beau was provided with highly structured training, an apprenticeship-like preparation in the company making men's suits and trousers. In a later occupational transition, Beau was again engaged in a structured set of experiences to ease him into the process of teaching through the beginning teacher preparation program. He then continued with his diploma of teaching while being employed as a Technical and Further Education (TAFE) teacher.

Another form of work-based experiences with educational interventions is structured dual experiences. This is a formal apprenticeship - a form of educational provision that is essential to allow occupational

transitions and results in certification that is recognised by industry. Several informants (e.g., Alex, Damien, Joe, Harry and Paul) in our study report that they completed their formal apprenticeships at an early stage of their working lives. However, the scope and extent to which they practiced the vocations in which they were trained varied due to personal circumstances. Alex, for example, had the opportunity to be employed in the technical side of occupations associated with his mechanical apprenticeship. He continued to engage in some casual maintenance work after retirement. Joe progressed from the technical side of the electrical vocation (i.e., a qualified electrical fitter) to an administrative role (i.e., a Consumer Liaison Officer) and then in a support/consultancy role (i.e., a Project Support Officer). Paul, on the other hand, upgraded his 5-year apprenticeship in toolmaking to a higher-level qualification (i.e., a Diploma of Engineering and a degree in Mechanical Engineering) as he transitioned into different roles during his career from being a Fitter to becoming an Engineer then Chief Mechanical Engineer. Damien, however, utilised his apprenticeship in manual arts to develop a different career trajectory. He only stayed in the trade for approximately six months then completed a course in teaching to become a manual arts teacher in secondary schools. It is noteworthy that all of these informants secured continuity in practicing the occupations in which they were trained, albeit in different ways. It was the combination of somewhat similar educational provision (i.e., formal apprenticeships) and different workplace experiences that supported and guided their learning in different ways. These informants and their distinct experiences and learning were driven by different subjectivities and intents.

The three models emphasise the significance of learning experiences in workplaces where individuals learn in the course of their daily work practices, have access to direct instruction and guidance provided by workplace-based experts or teachers, and are assisted by co-workers when needed. The situational bases for learning to meet the specific requirements of particular workplaces, which are determined by the nature of services and production goals, shape what workers and their managers see as important to learn. The data from this study suggest the three models in different ways and combinations are well aligned with the needs of those workers who are most interested in enhancing their competencies to meet productivity levels, sustain their

employment and advance their careers. Workers with these goals prefer their learning to be enacted in and through everyday work, usually by working alone in the first instance and supported by other workers, supervisors and trainers if and when needed (Billett et al., 2016). Some of that support may also be provided by educators/trainers from vocational education institutions. These educators/trainers are required to be involved if learning needs to be accredited for a qualification or to meet regularity requirements. In terms of the effectiveness of the three models, it is the quality of social interactions and the attitudes of employees and managers that underpin what is regarded and promoted as quality learning in the workplace (Billett et al., 2016). To this end, it is important to elaborate on workplace affordances and practices that contribute to augmenting such quality learning and experiences in the workplace.

Workplace affordances and practices

In addition to learning experiences in workplaces, the informants reflected on a range of societal, workplace, educational and personal practices that have assisted them in securing learning across their working lives. These practices vary across different work settings and are person-dependant. Workplace practices are initiated and shaped by the workplace norms, forms and practices in the physical and social circumstances where the individuals are employed. Many informants report on the characteristics of a supportive working environment featured in the form of practices where employees are provided with opportunities to i) progress into more senior roles, ii) acknowledge and draw upon experience and knowledge, iii) receive continuous training and professional development (including mentoring, co-worker support, and structured training), iv) rotate work roles or engaging in different kinds of work, v) practicing a high level of discretion, vi) working across different settings, and vii) engage in an educational program to upgrade knowledge and skills. Table 2 summarises the instances of reported workplace practices, hierarchically ranked based on the frequency of the reported practices.

Table 2 Instances of workplace practices reported by 66 informants

Workplace practices	*n*
Progressing into more senior roles	42
Acknowledging and drawing upon experience and knowledge	27
Organized/structured training	24
Mentoring	23
Rotating work roles or engaging in different kinds of work	21
Practising high level of discretion	20
Continuous training and professional development	20
Co-worker/peer support	18
Working across different settings	16
Engaging in an educational program to upgrade knowledge and skills	14

As shown in Table 2, the opportunity to progress into more senior roles was reported by the majority of the informants (i.e., 42 out of 66) as a key feature of a supportive workplace. A promotion is an incentive for workers to continue learning and maintain employability. This is also an acknowledgement of their experience and worklife learning. The workplaces are perceived to be supportive working environments and often have certain promotion schemes in place which creates flexible career pathways, allowing individuals to work to their strengths. Promotions as a pathway were important in providing individuals with opportunities and prospects for progression in their career thus learning to sustain their employability.

Interestingly, educational programs to upgrade knowledge and skills were least frequently reported (i.e., only 14 out of 66). This is likely because engaging in educational programs fulfills much of the initial occupational preparation and supplements on-going learning. Those experiences are through programs based in educational institutions or offered online. The experiences provide the kinds of learning individuals require for specific goals, such as changing occupations or developing new skills that cannot be learnt through their current work. However, some workers realise their learning through a combination of workplaces and educational provision of some kind occurring during their participation in their workplaces. Some informants experienced

transitions to occupations where a high level of qualification was a requirement. They either obtained the qualifications to progress into more senior roles within the same workplace or engaged in part-time or fulltime studies to transition into other occupations. For these informants, the transitions were personally initiated and quite intentional.

In addition to the workplace affordances, the informants also suggested a range of measures associated with learning. These were formulated as practices/strategies recommended to be enacted by workplaces given the key role played by experiences in work settings and the development of adults' occupational competence and workplace requirements. Phase 2 survey respondents rated the importance of these workplace practices/strategies on a 5-point Likert scale, ranging from Not Important to Extremely Important. Their responses are hierarchically ranked mean scores (i.e., averaged responses) in Table 3. The practices comprise: i) clear and transparent processes for engaging in work, learning opportunities and advancement, ii) work arrangements that are sensitive to family responsibilities, iii) retention policies for older workers, iv) inclusive work environment, v) workplace mentoring, vi) structured mentoring, vii) developmental plans for individual workers, and viii) on-site continuing education and training (CET) provisions.

Table 3 Ranking of the importance of workplace practices to promote employability

Workplace practices/strategies	Mean	Rank
clear and transparent processes for recruitment, promotion and retention of workers	4.25	1
working and learning processes that are sensitive to family responsibilities	4.11	2
retention policies for older workers	4.10	3
inclusive work environment (genuine inclusion of workers with special needs)	4.09	4
workplace mentoring as part of work activities	4.02	5
structured mentoring for career progression	3.96	6
learning and development plans for individual workers	3.94	7
on-site continuing education and training	3.87	8
off-site continuing education and training	3.73	9

As shown in Table 3, clear and transparent processes for recruitment, promotion and retention, were considered highly important, being ranked first, followed by working and learning processes sensitive to family responsibilities in the second rank. At the bottom of the rankings were on-site (ranked 8th) and off-site CET (ranked 9th) training. This suggests that workplaces were not expected to provide CET or structured

training, including structured mentoring for career progression (ranked 6th). Rather, employability is perceived as a process largely mediated by individuals as they advance through their careers. That is, adapting what they know, can do, and value to the specific requirements of the circumstances of practice (Billett, 2022) and maintaining occupational currency.

Across working life, opportunities for advancement or more broadly applying skills requires adaptability. Both forms of advancement require workers to adapt what they know, can do, and value to different circumstances and tasks. Hence, workers' adaptive capacity is central to their ongoing employability as workplace and occupational requirements change. In this regard, workplaces can primarily contribute to achieving two (out of four) goals of employability: i) sustaining employment and ii) securing advancement (Billett, 2022), mediating individuals' learning process to extend employability in the form of advancement or extending the scope of occupational practices.

Conclusions

The findings from the study highlight the exigencies of workplace learning and validate that the social, cultural, physical and material elements in work sites provide rich sources of learning for working adults. However, some form of guidance and/or educational interventions further consolidate what they can learn individually through everyday work tasks. Moreover, learning becomes more effective if organised and structured around daily work tasks. Hence, three continuing education and training models suggested by Billett et al. (2016) have relevance. Individual experiences are gained as workers engage in the moment by moment learning and work though such learning is contingent on the kinds of experiences that may be available in the course of work tasks. These may be routine activities and interactions where workers can learn independently or with indirect guidance to achieve efficiencies. Direct guidance can be facilitated by experienced workers (e.g., supervisors/managers or co-workers). This aligns with Eraut's (2007) research showing that workers learn more from others in proximity. The findings also vouch for Eichinger and Lombardo's (1996) 70:20:10 model which holds that 70% of workers' learning arises from experiences in the workplace, 20% from social learning (interactions with others) and 10% from formal courses.

Educational interventions can be provided by internal trainers or those from educational institutions. In any case, effectual learning is contingent upon workplace affordances, the scope of experiences accessible to workers, and the agency and constructive efforts of the individuals.

Drawing on the findings of our study, we suggest a set of considerations to review and appraise workplace practices to enhance workers' employability and worklife learning. These considerations are centred around the three models for continuing education and training proposed by Billett et al. (2016) and on a continuum of expansive and restrictive learning environments (Fuller & Unwin, 2011).

1. Aligning workplace practices and the organisation of opportunities to match with workers' personal curriculum whereby they can engage in wholly work-based experiences. This calls for careful design of the learning curriculum in practice settings as well as workers' agency to secure learning opportunities.
2. Affording a range of opportunities for learning individually, performing higher duties, and working across different settings to widen the scope of tasks and rotational work with direct and/or indirect guidance. These arrangements could be included in individual professional development plans and integrated with the workforce development plans of workplaces.
3. Supporting workers to undertake certified programs at educational institutions to upgrade their knowledge and skills. Such support could include funding for fees and time away from work to attend courses. Workplaces could also negotiate the delivery of in-house training by internal or external providers.

Notably, the participants in our study stressed the importance of workplace practices to support learning, sustain employment and promote employability. These included processes for recruitment, promotion and retention. Interestingly, there was less expectation from workers for provision of continuing education and training, instead greater emphasis on the kinds of affordances and a opportunities they can access at work. This implies workers are willing to take agency for their learning in workplaces.

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Promoting student readiness for work-life through internships: Challenges and support

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There are growing expectations that tertiary education graduates will be ready for working life, that is, possessing the capacities to participate effectively in an occupational practice in a specific work situation. Yet, graduates are often unprepared to fulfil this expectation. In response, tertiary education increasingly includes workplace experiences (i.e., practicums, internships, & work placements). It is necessary to understand these experiences' efficacy and their optimisation to promote work-life readiness. Drawing on students' experiences of internships, this paper discusses what constitutes the value of internships in post-secondary diploma courses in Singapore. A quantitative analysis of interview data identified the contributions afforded through these experiences in workplaces – students' intentional engagement, and their readiness for working life. Central here is how these contributions promote the development of the

adaptability required for effective participation in contemporary working life. The analysis identifies challenges including students' adapting to new work environments, navigating workplace practices, and developing occupational capacities. Workplace supervisors' and host educational institutions' support suggests interns' adaptability can be enhanced by promoting the relations between the support they received, on the one hand, and their engagement with challenges during internships, on the other. These findings offer an understanding about the experiences and outcomes of interns' learning through workplaces and offer implications for supporting and augmenting transitions into working life.

***Keywords**: internship, capacities, work readiness, adaptability, support, engagementy*

Student readiness for work-life and tertiary education

Tertiary education has a dual role to play in the development of its graduates. Beyond offering educational experiences, tertiary education provisions are also tasked with preparing individuals who are not only academically proficient but also equipped with the essential skills to work effectively in the dynamic contemporary job market and global economy (Tymon, 2013). There is a growing global imperative for tertiary education (i.e., vocational, and higher education) students to be ready for working life upon graduation, and, in some instances, be job ready (OECD, 2010). This readiness often comprises students having the capacity to participate effectively in working life, in a specific occupational practice and work setting (UA, 2008). This paradigm shift in the tertiary educational landscape is reflective of the broader goals set forth by influential organisations and policymakers. For example, the OECD has emphasised the significance of job readiness as a key requirement of contemporary graduates (OECD, 2010). It is increasingly being expected for the outcomes of tertiary education to go beyond initial occupational competence to include being able to adapt to the requirements of workplaces where they are employed (OECD, 2019) and include the kinds of interpersonal and self-initiating capacities that permit effective engagement in working life, and the means to participate constructively and effectively in work. Whilst these stand

as demanding educational goals, they are, nevertheless, important for contemporary working life. Understanding how occupational practice is enacted in specific workplace settings is essential for working in teams comprising those from other occupations, as well as being punctual, reliable, able to work both independently and interdependently, and adaptive to solve problems (Billett, 2009). Whilst these are difficult educational goals to achieve, they are important for two reasons.

Firstly, a successful working life is more than having and effectively practising a body of occupational knowledge (Howe, 2008). It also includes the capacities required to be an effective individual employee, to work as a team and contribute to the viability of the workplace (Barrick et al., 1998). Secondly, is the ability to be adaptive with workplace conduct, occupational practice and the requirements of the work setting where tertiary graduates are employed. This adaptability is important, perhaps now more than ever, as ways of working and workplace practices are constantly changing, as are the requirements for occupations and those of work settings (Carnevale & Smith, 2013). So, more than initial occupational preparation reproducing existing competencies, it is important that the educational processes lead to graduates developing adaptive capacities.

Due to these imperatives, there is a noticeable shift in education towards reshaping curricula and pedagogical strategies to better equip graduates with the essential skills and competencies expected of them (Li, 2022). Central here is the inclusion of workplace experiences for students in the form of practicums, internships and work placements with varying durations and workplace arrangements (Asian Development Bank, 2017; Jackson, Fleming, & Rowe, 2019). It is through these kinds of experiences that these employability capacities are aimed to be generated. The aim of this paper is to appraise the educational potential of internships for postsecondary students as enacted in a particular institutional and national setting, i.e., the polytechnics in Singapore for developing these capacities. Importantly, we want to examine the ability of internships to generate the adaptive learning outcomes that are central to tertiary education graduates' transition to working life.

The conceptual premise adopted for this appraisal is on the interactions between what has been afforded to students in terms of structured educational provisions and workplace internships, on the one hand,

and how students have come to engage with these experiences, on the other (Billett, 2001b). This duality of affordances and engagements provides a means to evaluate the combination of experiences that arise from these internships, by illuminating the challenges faced and the support provided for these students to develop the kinds of workplace, occupational and situational adaptability that will allow students to become ready for work-life.

In all, it is proposed that internships are crucial to achieving these goals, and perhaps most likely when the education provision is well structured to offer appropriate experiences, support and guidance and students engage with them. In making its case, the paper progresses by firstly discussing adaptability as a critical element of promoting student work readiness, then a description of a practical inquiry conducted in Singapore through interviews with student interns is used to appraise the provision of achieving these educational goals, followed by an elaboration of the quantitative findings.

The quantitative analysis of interview data sought to identify patterns of responses from the informant cohort about what was afforded through the workplace experiences and the interns' exercise of their agency leads to the development of readiness for engaging in working life within their occupational fields. It also gauged the development of the adaptiveness required for contemporary working life, including the transition from tertiary education to effective work performance, through these experiences. Drawing upon Giddens (1990) concepts of structure and agency, and of educational counterpart of affordances and engagement, it was found that efforts to provide environments in which interns can exercise their agency within the boundaries of workplace requirements, be supported and guided in that will most likely lead to effective and adaptable learning outcomes that are essential for the transition into working life and effective performance in workplaces.

Adaptability as critical element in promoting student work readiness

Fundamental to the broad project of education is that it should not just lead to the reproduction of the knowledge that has been presented and taught. Instead, its outcomes should have applicability to circumstances and situations beyond those in which it was learnt. Hence, the adaptability of what has been learnt becomes a benchmark

for what might constitute worthwhile education. The concern, therefore, is for the knowledge developed through tertiary education for work-life capacities, occupational competence, and situational performance requirements to be generated in ways that permit their adaptability to other circumstances and situations (Akkermans & Tims, 2017). That is, to assist students in adapting what they have learnt in tertiary education into workplaces and demonstrate effective practice. Consequently, developing adaptability is central to considerations of how educational provisions are organised, enacted, and evaluated (Savickas, 2005). A focus on adaptability is, therefore, quite central to making judgements about whether educational provisions are worthwhile in achieving those goals. Here, the focus is on specific educational interventions in the form of internships, and their ability to achieve these outcomes. That is, processes in which students are provided with experiences in which they engage in the workplace not as visitors or observers, but as active participants in the conduct of everyday work activities, albeit with the status of being a novice or new employee (Bhandari et al., 2022).

It is reasonable to suggest that most contemporary theories of education, as well as those associated with learning and development, adopt a constructivist perspective. The common delineation within this perspective is between one being more a product of individual constructivism alone (i.e., cognitivist perspective) or that which privileges the social contributions to the construction of knowledge (i.e., social constructivism). However, rather than adopting a binary approach, increasingly the contributions of both the individual and social are deemed inevitably important, often interdependent, and usually relational (Billett, 2006). This means that it is important to account for both the contributions that the person brings to the learning and that from the physical and social world beyond the skin, so to speak. As foreshadowed, at a meta-theoretical or explanatory level this is often captured in discussions about the contributions and tensions between structure and agency (Giddens, 1979). That is, what is structured by the kinds of experiences suggested to individuals by the social world, in the form of affordances. These affordances are invitations to engage in social settings and with interlocutors (e.g., co-workers, experts) who can provide access to the kinds of knowledge

required for effective performance (Billett, 2001b).

However, beyond what is afforded to individuals is how they come to engage with it. That is, how the invitations are taken up. Educational provisions albeit in hybrid institutions or workplaces are nothing more or less than invitations to change. It is how individuals take up that invitation that is central to how and what they learn (Billett, 2001a). Internships as enacted in workplaces can provide structure in the form of the activities and interactions that they provide for the interns to engage with, just in the same way that this occurs within the students' education institutions. According to Giddens, the term structure refers to "structural property" – "this can be understood as rules and resources, recursively integrated in the reproduction of social systems" (Giddens, 1979, p.64), of which both workplaces and educational institutions constitute. Hence, the workplace can be said to be a form of institution that provides affordances and opportunities for interns. Internships at the workplace serve as an invitation for interns to experience and learn from what they are afforded through those activities and interactions. This invitation includes opportunities to gain 'hands on' experience, develop new skills and expand their knowledge, which are of quite a different kind than those available in educational settings (Jackson et al., 2019). Giddens suggests that the workplace provides a structured learning environment that is more effective than classroom-based learning, as students can apply their knowledge to the work-related tasks and see the applications of their learning (1999).

Whilst Giddens's conceptions of structure and agency are seen as being seminal These ideas have been adopted within educational parlance as comprising affordances and engagements (Billett 2001b, Osman, Shaari & Hung, 2022). That is, what physical and social environments, albeit workplaces or education institutions afford individuals in terms of experiences from which they can learn: i.e., their invitational qualities. The degree by which they invite the learner to engage and participate and access the knowledge that arises from social sources and environments such as educational institutions and workplaces which in curriculum terms, refers to the enacted curriculum: what is provided for the student. Yet, on the other hand, how students come to engage with what has afforded them, the degree by which they elect to engage,

select which invitations to accept and through what means and with what degree of intentionality and agency. For example, in internships, students are afforded experiences within both the educational institution and workplaces. The quality of those affordances is premised on a range of factors associated with the kinds of experiences they are provided with, the opportunities provided by these two kinds of institutions, and the level and kind of guidance afforded by educators and workplace mentors. Yet, no level of affordances can guarantee the kinds of learning outcomes. This is because, ultimately, these are mediated by learners based upon what they already know, can do and value, their interpretations, intentions, and agency. Hence, there needs to be a consideration of both what is afforded the intern student, and how they come to engage with what has afforded them.

In the investigation presented and discussed here, agency and structure in the form of what is afforded to these interns and how they come to engage with them are used to evaluate the educational worth of internships. The quality of that worth is the ability to generate adaptability. This is used to evaluate the degree by which this combination of experiences and students' engagement with them are likely to be generative of adaptability and leads to conclusions about the educational worth of these provisions. These processes and outcomes are investigated here by gathering data from interns, educators and workplace supervisors associated with internships in post-secondary education institutions (PSEI) in Singapore. These PSEIs, also referred to as polytechnics, afford students a semester of compulsory internship in a selected workplace with the duration of over five months.

Through these student internships, the polytechnics provide opportunities for interns to participate in and attain workplace experience to promote their readiness for work-life, developing further their occupational and broader work-life capacities. This engagement allows for the occurrence of the kinds of transactional experiences referred to above, where interns are afforded opportunities to engage in workplace activities and interactions with a a focus on also developing adaptability. Through this process, interns can integrate their skills and knowledge learnt in the classroom into real-work environments (Baartman & Bruijn, 2011). The combination of experiences in PSEI and enterprise affordance, and importantly the students' transactions within them potentially allows interns to enhance their adaptability,

preparing them for the demands and challenges of working life. It is appraising that potential that is the focus of the practical investigation reported and discussed here.

Research Methods: Investigating internships at work

The practical inquiry investigated the development of adaptability from school to work in 20 young adults, aged 19 to 23, participating in internships provided by the polytechnics. Having gained their consent, participants were engaged in a semi-structured one on one interview to share about their internship experience. They were asked to describe in detail and their current job role, challenges faced, support provided, their feelings and expectations of the internship process.

The interview items were developed from an initial literature review and piloted with minimal change before the commencement of data collection. The qualitative data comprised interview transcripts which were carefully read and thematically analysed by two researchers independently, with guidance from members of the research team. Firstly, a six-phase thematic analysis, using a hybrid approach of inductive and deductive analysis (Braun & Clarke, 2006; Clarke, Braun & Hayfield, 2015), was conducted. A combination of 'theory-driven'/'analyst-driven' (i.e., deductive – producing codes relative to a pre-specified conceptual framework or codebook) and 'data-driven' (i.e., inductive - producing codes solely reflective of the content of the data) approaches was adopted. This process resulted in eight themes to be identified. The secondary process then involved the categorisation of these themes using dual coding measures aligned with each of the eight themes.

These processes were undertaken, and an interrater reliability exercise was conducted to verify the reliability of the categorisation of the data. Using the categorisation of one researcher as a baseline, the percentage agreement of the other researcher classifying the themes and associated dual coding is shown in Table 1. As shown in this table, there was 100% agreement for the categorisations of themes after consultation.

Table 1: Inter-researcher agreement over categorisations of themes and associated dual coding before and after consultation.

Theme	Variable	Agreement after initial categorisation (%)	Agreement after consultation (%)
Experiences	productive/unproductive	90	100
Engagement	rich engagement/ superficial participation	75	100
Intern expectations	fulfilled/partially fulfilled	80	100
Workplace scaffolding	expansive/restrictive	65	100
Workplace provision of experiences	directed and engaging/unstructured and peripheral	85	100
PSEI lecturer scaffolding	expansive/restrictive,	65	100
Interns' responsiveness to challenges	fulsome responses/measured engagement	95	100
Intern adaptability	demonstrated adaptiveness/limited adaptive approaches	85	100

Further to the descriptive analysis is the bivariate analysis between affordances and engagement to be undertaken. That is, correlation analysis of the variables (i.e., themes) described above was conducted, using Pearson correlation (Science Direct, 2021), to explore the relationships and patterns between these variables. Pearson correlation allowed for a comprehensive examination of whether a relationship exists between variables (e.g., affordances and engagement) then determining the magnitude and action of that relationship thus allowing for the understanding of the factors influencing the outcomes and experiences of interns. Essentially, it is the quantitative analysis of the qualitative interview data that is how the data were analysed for appraising patterns in how these key thematic elements were able to describe what was afforded through workplace experiences and support and also that provided through the educational institution, on the one hand, and also measures of how the interns engaged with their experiences in the work setting, on the other.

Findings about support and engagement

Interviewing student interns about their internships provided valuable insights into their experiences and challenges they encountered, and how they responded to them (i.e., affordances and engagements).

Descriptive and correlation analysis was generated through SPSS statistical software version 27 and presented in Table 2 and Table 3, respectively. Table 2 presents an overview of the categorisation of the data under the eight themes, dual values through which the variables were categorised, the number of responses to those variables and the percentage of respondents whose contributions were aligned with that variable. Some of these variables are aligned with affordances (i.e., workplace and educational scaffolding, quality of workplace experiences), whilst others are more aligned with the agency of the interns (i.e., intern responsiveness and adaptability). The variable is presented in the left-hand column and the value attributed to it by the participants is presented in the column to the right of it and in the right column, the number of participants indicates the corresponding value.

Table 2: Descriptive overview of thematic data

Variables	Values	N
Experiences	Productive	19
	Unproductive	1
Engagement	Rich engagement	15
	Superficial participation	5
Intern expectations	Fulfilled	10
	Partially fulfilled	10
Workplace scaffolding	Expansive – open and positive	11
	Restrictive – closed and specific	9
Workplace provision of experiences	Directed and engaging	9
	Unstructured and peripheral	11
PSEI Lecturer Scaffolding	Expansive – open and positive	14
	Restrictive – closed and specific	5
Interns' responsiveness to challenges	Fulsome responses	12
	Measured engagement	8
Intern adaptability	Demonstrated adaptiveness	14
	Limited adaptive approaches	6

These analyses provide indications of key contributions and the frequencies with which they were reported by the informants, which are now discussed in the following sections.

Experiences

The interns' reporting on the quality of their experience was classified as being either "productive" or "unproductive". Productive experiences were those classified as when the intern reported them as being beneficial and insightful in so far as they have learnt productively from them. This classification suggests that the interns had worthwhile learning experiences, developed new skills and that their expectations were met through the internship. An unproductive experience, on the other hand, implies that the interns found limited benefits of value of their internship. This could be due to the lack of guidance, limited opportunities for skills development, or a mismatch between interns' expectations and the tasks assigned. This may cause interns to feel dissatisfied with their internship experience. As indicated in Table 2, overwhelmingly, the interns reported that their experiences were productive.

Engagement

The interns' responses about engagement were classified as being either "rich" or "superficial" depending upon the levels of involvement and participation by the intern during the internship. Rich engagement was classified when high levels of involvement such as the intern seeking out opportunities to actively participate in the work tasks given were reported. Conversely, data was classified as being of superficial participation when a lower level of involvement was reported, suggesting that the intern is less proactive, showing limited initiative and maintaining a more passive role in the company. As indicated in Table 2, 15 of the 20 informants reported that their engagement was rich which, is consistent with the overall finding about internships being productive for their learning.

Intern expectations

Intern expectations refer to the anticipated outcomes that interns had of the internship. These expectations were categorised as either "fulfilled" or "partially fulfilled" based on whether the internship experience was reported as being aligned with the intern's original expectations of those experiences. Fulfilled expectations were indicated by the intern

having a rewarding experience that matches their initial expectations the internship. A partially fulfilled expectation suggests that interns reported a mix of satisfaction and disappointment, especially when they encountered unmet goals. The responses here are mixed and balanced with half of the interns reporting under both classifications of expectations, as presented in Table 2. So, whereas measures of the productive and engaged qualities of these experiences were high, interns reported in equal measure their expectations had been fulfilled or partially fulfilled.

Workplace scaffolding

The degree by which support has been provided in the work setting is captured here under the rubric of scaffolding. It refers to the structure and guidance provided to the interns to assist their development of skills and abilities required to participate in and complete work tasks successfully. "Expansive – open and positive" scaffolding refers to an environment that encourages exploration and autonomy, providing the intern with a positive and supportive culture that values continuous learning. "Restrictive – closed and specific" refers to a more structured and controlled environment. This type of scaffolding usually entails limited flexibility and requires adherence to strict protocols. However, it is important to be aware that being restrictive is not necessarily a negative quality as it may also capture the characteristics of the work being undertaken and the need for that work to be carefully controlled, managed, or regulated. As with interns' expectations, the reported findings here are also quite balanced with only 11 of the 20 interns referring to expansive opportunities during their internships, as presented in Table 2.

Workplace provision of experiences

Another measure that captures the affordances of the work setting is the degree by which the informants characterised the qualities of their workplace experiences (i.e., activities and interactions) and the level of direction and engagement provided to the intern. "Directed and engaging" provision refers to a structured and purposeful approach, where interns are given clear tasks and guidance. "Unstructured and peripheral" provision implies a lack of clear structure or focus. Interns may not receive clear guidance or meaningful tasks. As indicated by the

presentation of the analysis in Table 2, on balance, slightly fewer interns reported structured experiences than those reporting unstructured experiences. However, again, these responses need to be understood in the context of the kind of work being undertaken by the interns and the degree to which a structured or unstructured approach is appropriate in those work settings and for different kinds of work tasks.

PSEI lecturer scaffolding

PSEI lecturers' scaffolding represents another affordance in the form of support and guidance provided by these lecturers during the internship process. That is, the lecturers provide support before the students become interns in the workplace and have contact with the workplace supervisors. They provided guidance and support for the interns periodically and as requested by them associated with their progress within the internships. Noteworthy is that PSEI lecturers' scaffolding was categorised as being "expansive: open and positive" when it encouraged active intern engagement and exploration. Data classified as being indicative of "restrictive: closed and specific" refers to PSEI lecturers adopting a more structured (i.e., didactics) approach, where there is specific advice and guidelines for the intern to follow. As indicated in Table 2, 14 of the interns reported lecturers taking an expansive approach. Of course, there are circumstances in which less expansive guidance would have been required in terms of intern conduct in the workplace and encouraging them to adhere to workplace practices, including but not restricted to aspects of safety and following protocols.

Interns' responsiveness to challenges

Interns' responsiveness to challenges refers to the degree to which they can address workplace challenges, such as new tasks, problem solving, or requests to engage in new areas of work. In some ways, addressing these challenges represents the exercise of their agency, and with it engaging in non-routine problem-solving activities which are of the kind that both rely upon adaptability but also develop it (Billett, 2022). Data indicated many of the interns engaged with such challenges in enthusiastic and effortful ways and, sometimes, proactively sought solutions to these problems or challenges. These instances were classified as a "fulsome response" in the dual coding system. They are

characterised by resilience and willingness to achieve positive outcomes. Conversely, data that was classified as the intern taking a more limited or cautious approach to the tasks were classified as "measured engagement". This could mean they exhibited a more moderate level of initiative as compared to fulsome responders. As indicated in Table 2, when self-reporting such challenges the interns indicated high levels of 'fulsome responses' on their part (i.e., 12 out of 20). The data indicate a pattern of engagement that is consistent with self-reports about their adaptability efforts. That is, the contributions to their learning were not restricted to what had been afforded them through the workplace experiences but were enacted and augmented through their own agency and effortful engagement in new tasks and challenges.

Intern adaptability

Interns' adaptability was categorised as "demonstrated adaptiveness" which refers to interns who exhibited a high degree of flexibility, and openness to change. That is, when interns indicated that they had adapted to the challenges of the workplace and embraced unfamiliar tasks. Conversely, when the data indicated that the interns have struggled to adjust to the changing work environment they were coded as taking "limited adaptive approaches". As indicated in Table 2, the interns reported high levels of adaptability (i.e., 14 out of 20). This finding about adaptability is interpreted as being very positive in terms of the interns' engagement in developing the capacities for and exercising adaptability. It would be inappropriate to expect that all the interns would be able to demonstrate adaptability through their internships, given that they were engaged in activities that are often constrained, understandably, by workplace practices and protocols. Here, the concept of bounded agency (Shanahan & Hood, 2000), comes to the fore. That is, the interest in and ability of individuals to exercise their agency given the context of the boundaries prescribed for them. Workplaces have clear boundaries that indicate tolerances for agency and adaptability given specific kinds of work practices and needs. Hence, the overall pattern here indicates that within bounded circumstances and where possible the interns engaged in adaptive practices.

In these ways, the pattern of the response to these variables indicates that, overall, internships provided productive and engaging experiences

in work settings even though not all their expectations were fulfilled, and that the support they received from both the work settings and their host educational institution were, broadly, helpful, and supportive of the educational experience. Albeit self-reported, the interns suggested that their agency and engagement likely underpinned much of the success of these internships. That is, an individual cannot rely solely upon the affordances of the polytechnic and the workplace, but that interns themselves also need to exercise their personal agency.

Correlations of affordances and engagement

The results of correlation analysis are presented in Table 3. In the left-hand column are the variables and across the tables to their right are the correlations related to those variables. The Pearson correlation coefficient was computed to assess the strength of the association between two variables and the direction of the relationship. The value of the correlation coefficient varies between -1 (strong negative relationship) and +1 (strong positive relationship), thereby indicating the degree by which the two concepts are aligned positively or negatively. The value at or close to zero implies a weak or no relationship. The coefficient bolded indicates a positive correlation between the two variables.

Table 3: Results of correlation analysis

		Engagement	PSEI Lecturer Scaffolding	Workplace scaffolding	Workplace provision of experiences	Intern adaptability
Engagement	Pearson Correlation	1	.278	**.638****	**.522***	.126
	Sig. (2-tailed)		.250	.002	.018	.597
	N	20	19	20	20	20
Intern expectations	Pearson Correlation	.346	.151	**.503***	**.503***	.436
	Sig. (2-tailed)	.135	.537	.024	.024	.054
	N	20	19	20	20	20
Workplace scaffolding	Pearson Correlation	.638**	-.025	1	**.818****	**.504***
	Sig. (2-tailed)	.002	.918		.000	.023
	N	20	19	20	20	20
Interns' responsiveness to challenges	Pearson Correlation	.236	.459*	.492*	**.533***	**.802****
	Sig. (2-tailed)	.317	.048	.027	.015	.000
	N	20	19	20	20	20
Workplace provision of experiences	Pearson Correlation	.522*	.088	.818**	1	**.592****
	Sig. (2-tailed)	.018	.720	.000		.006
	N	20	19	20	20	20

Notes: Correlation coefficient values less than +0.5 or greater than -0.5 are not considered significant (by most statisticians).

The following seven conclusions can be drawn from Table 3. Firstly, when workplace scaffolding fosters an open and expansive environment, the interns experience rich engagement in their work activities and interactions from which they learned. Secondly, when workplaces provide experiences that the interns found interesting and worthwhile, they reported having had, the interns experienced rich engagement. Thirdly, when workplace scaffolding encourages an open and expansive approach to work activities and interactions, the interns reported that their expectations were fulfilled to a greater degree. The same occurred when workplaces provided support and direct guidance led to interns reporting that their expectations had been fulfilled, as the fourth consideration, which was aligned with interns reporting that they demonstrated productivity and positive to new workplace challenges. Fifth, there was some correlation between workplace as having an open and expansive environment and the reporting of interns demonstrating adaptiveness in and through their work. Sixth, and perhaps not surprisingly, when the interns reported engaging fulsomely in their responses to workplace challenges, they also demonstrated adaptiveness. Equally, and finally, in their workplaces provided directed and engaging experiences, the interns demonstrated adaptiveness. It is this adaptiveness that is a central concern for the educational outcomes of internships.

Discussion: Internship support and opportunities for learning adaptability

The findings from the quantitative analysis of the qualitative data provide valuable insights into the relationships between the different factors involved in these students' internship experience in promoting adaptable learning outcomes. Through examining how the factors interplay with one another, a more informed understanding of the types of experiences provided and support needed for interns to transition to working life can be developed, both in terms of direct affordances (i.e., workplace and education institutional scaffolding), but also the opportunities and scope to exercise and develop further their agency and adaptability, albeit within the boundaries of workplace requirements. The quantitative findings revealed that interns' adaptability was shaped by interplays between workplace structures in terms of the activities and interactions they were afforded, including the boundaries placed upon

their agency by workplace protocols and practices, on the one hand. Yet, on the other, was their agency in seeking learning opportunities and engagement and then their engagement in adaptive actions when seeking to respond to workplace challenges including new tasks, problems to be solved and new areas of work in which to engage. These findings emphasise the importance of workplace experiences and supportive relationships in promoting intern engagement, expectation fulfilment, and adaptiveness.

These quantitative findings indicate statistically significant relationships between workplace scaffolding, workplace provision of experiences, intern engagement, intern expectation fulfilment, intern responsiveness to challenges, and intern adaptiveness. However, caution needs to be exercised because the number of informants is very small, and the correlations are, accordingly, limited to what can be proposed from such a small sample size. Nevertheless, based on the quantitative analysis of these data, four key findings emerge from this analysis.

Firstly, there is a positive correlation between an open and expansive workplace scaffolding that fosters and encourages intern engagement. When the workplace provides interns with an environment of higher support, they reported having higher levels of engagement in their daily tasks. Secondly, there is a significant relationship between workplace provision of experiences and interns' reported fulfilment of expectations. This means that when workplaces provide directed and engaging experiences, these interns reported believing their expectations were met, leading to a more fulfiling internship experience. Thirdly, the data analysis indicates that when workplace scaffolding was open and expansive, interns were reported to have exhibited higher levels of adaptiveness. This suggests that a supportive workplace environment fosters interns' adaptability to adapt to new challenges. Fourthly, the analysis indicates a positive correlation between workplace scaffolding and the provision of experiences. These two factors are interrelated, indicating that an engaging and well-structured workplace tends to provide more opportunities for interns to grow. Overall, the quantitative analysis of the qualitative interview data provides patterns of responses that underscore the importance of an engaging and supportive workplace environment in promoting expectation fulfilment, adaptiveness, and intern engagement.

Giddens' theory emphasises the dynamic relationship between structure and agency, suggesting that individuals have the capacity to shape and be shaped by their environments (1984). In relation to the findings above, these interns' workplace experiences provided through their educational institutions represent structures that interns encounter and are suggested to them, through the norms, forms, and practices of those institutions (i.e., affordances). Conversely, the agency of the interns refers to the degree by which they can and their ability to make choices, exercise autonomy and navigate within the structure (i.e., engagement). It is recognised that personal capability is central to taking action and initiating change through purposeful and meaningful choices (Bishop, 2017).

The structure of the workplace frames the interns' experiences, and in many ways provides boundaries for their agency (Shanahan & Hood, 2000). This includes the availability and difficulty of tasks, access to resources, and the support given to them by their supervisors. This workplace structure influences the opportunities available for interns to adapt to the new environment and exercise agency, advanced here as workplace affordances. These affordances include workplace scaffolding and provision of experiences by supervisors and co-workers, and also by lecturers in the PSEIs. These elements represent the frameworks and support systems established by the company for the interns. On the other hand, agency represents the intern's ability to make choices and respond within the context of workplace structure (i.e., how they come to engage). This constitutes their proactive behaviour and engagement in their work tasks. Learning opportunities do not necessarily lead to rich or productive learning; individuals must actively engage with these opportunities to facilitate learning, Individual behaviour has the potential to influence the overall learning environment within the workplace (Helfer, 2023). As interns, they can advocate for more learning opportunities or conversely, their reluctance to learn can impact the nature of the work (Helfer, 2023).

As the Giddens' theory of structure and agency (1984) highlights their interdependence, the workplace structure sets the boundaries, while the agency shapes the interns' responses and actions within the boundaries. The findings above demonstrate how interns' adaptiveness is related to the interplay between workplace scaffolding, workplace provision of experiences, and learning opportunities. The workplace structure shapes

the opportunities afforded to these interns, while agency allows interns to actively engage and adapt to different circumstances. Individuals may switch roles, leading to shifts in their levels of adaptability, creativity, and critical responsiveness to evolving structures (Emirbayer & Mische, 1998). The findings indicate that a supportive workplace structure can potentially assist interns to exercise agency, engage actively with their tasks, fulfil their expectations, and demonstrate adaptiveness. Likely, as interns demonstrate their ability to be adaptive, more opportunities will be afforded to them in their work settings. All of this is consistent with Giddens' (1979) view that agency and structure are mutually constitutive, as interns' actions and responses are influenced by and influence the workplace environment. Interns actively exercise their autonomy and agency by engaging in meaningful collaborations to define challenges, validate objectives, and propose innovative solutions (Hayes & Cejnar, 2020). This process not only fosters independence but also empowers interns to play an active role in problem solving and goal setting within the workplace.

Implications for educational practices

These findings indicate implications for those involved in the planning, enactment, and evaluation of internships about how they can assist tertiary education students in making successful transitions into working life. The insights advanced from this study may be used to guide future actions aimed at improving the internship experience and outcomes. For post-secondary educational institutions, these findings inform curriculum enhancements, ensuring that students will be equipped with the necessary tools to navigate workplace challenges and adapt effectively. The analysis highlights the importance of providing interns with opportunities for rich engagement and scaffolding, within the boundaries of practice. By equipping interns with career planning and development, interns are more likely to increase their career adaptability over time and facilitate school to work transition (Koen & Vianen, 2012). For enterprises, employers can benefit from the findings by understanding the key factors that contribute to a positive and productive internship experience for their interns. Having a mentor at the workplace is important for interns' school-to-work transition because mentors offer guidance, skill development, networking opportunities, feedback, motivation, confidence, career advice, and

conflict resolution, all of which are critical for interns to succeed in their new professional roles (Dymock, 1999). By taking steps to improve their orientation into the workplace, providing clear expectations, and establishing a supportive environment that encourages intern adaptability, the learning, adaptability, and productivity of interns may increase (Le Maistre, 2006).

These processes and outcomes could well lead to improved satisfaction among interns and more informed decision-making about their occupational and work life pathways. Internship lecturers might also use these implications to refine their support strategies. By recognising the potential of their role in supporting interns' engagement and adaptive learning through their internship these tertiary students can also provide support in the form of feedback and guidance. In conjunction with workplace supervisors, lecturers can also seek to create learning opportunities to stimulate intern adaptiveness.

Conclusion

In conclusion, the findings of this investigation emphasise the need for collaboration and measures from all stakeholders involved in supporting student internships. Importantly, all of these arrangements need to consider the dual contributions of social settings (i.e., education and workplace) in affording activities and interactions that can support intern learning and developing adaptability within the boundaries of effective and safe work practice. Collectively, these may enhance the internship experience, allowing students to be better prepared for the working world.

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Social participation, altruism and learning opportunism: A phenomenography of adults' learning through workplace experiences in rural community volunteering

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Workplace experiences are central to adults' learning and development, providing opportunities for significant and valuable lifelong learning. Research into adults' learning in volunteer work attests to its significance and value across the spectrum of adult learning, serving instrumental, social, and altruistic purposes for the learner and enriching lives through furnishing individual, collective and broader community benefits. But how does adults' learning through workplace experiences in community volunteering contribute to their agency and lifelong learning while also generating wider collective benefits? What are people learning, and what are the learning incentives, processes, mechanisms and affordances at play? This article reports selected findings from a phenomenographic investigation into a group of community volunteers' experiences of workplace learning in a social enterprise in an Australian rural town coming to grips with transitioning to life in a digital era. The findings illuminate the experience of community-based workplace learning from the adult learner's perspective, and specifically, learning embedded in social participation in rural community volunteering and associational life, providing new insights about adults' experience of

learning through volunteering in the interests of understanding and furthering their own lifelong learning and development goals while contributing to their communities of interest, practice and place.

***Keywords**: lifelong learning, adult learning, informal learning, community volunteering, community informatics, phenomenography*

Introduction

Adults' experiences of volunteering are as diverse as the purposes for and circumstances of their engagement. Studies of volunteering in rural Australia report differences between volunteering in metropolitan and rural areas related to demographics and the nature of employment and associational life in rural communities, highlighting overlapping networks, fewer available resources and a preference for informal learning among rural volunteers (Kilpatrick et al, 2010; McLachlan & Arden, 2009; Davies & Lockstone-Binney, 2018). There are also different types of volunteers, ranging from "classic community volunteers" with a regular and sustained commitment to one or more groups or organisations to "episodic volunteers", whose volunteering is likely to be more conditional on meeting their own needs (Schugurensky et al., 2010, p. 82). Notwithstanding this diversity, when individuals choose to contribute their time and skills – or labour – to a local community group or organisation with a service mission, they are invariably participating in work activities, and concomitantly, workplace learning experiences.

When considering settings for community volunteering, so-called 'third sector', or 'civil society' models – such as place-based learning communities, neighbourhood houses, men's and women's sheds, charitable organisations and other social enterprises – are well situated to afford the kinds of learning opportunities that cater for diverse adult learners' development needs, goals and lifespan trajectories. This article draws on the findings of an investigation into volunteers' experiences of workplace learning in a community organisation in an Australian rural town seeking to harness the possibilities presented by digital technologies and the Internet for enhancing social connectivity,

community engagement and participation in lifelong learning among its residents. The focus of the study is on these volunteers' engagement in workplace learning experiences in the context of their involvement in the organisation's activities, including the development, management, delivery and use of its services, facilities and technologies.

Literature Review

Adults' learning in the context of their volunteer work is typically labelled as being 'informal' to distinguish it from more structured training and formal education. Extensive studies into volunteers' learning confirm its breadth, depth and significance, with increased confidence, self-esteem, personal agency and organisational leadership skills reportedly the most frequently highlighted outcome areas for volunteers (Elsdon, 1995; Kavanaugh et al., 2009; Livingstone, 2010; Plant, 2014; Schugurensky et al., 2010). Theorising about the content, processes and mechanisms of volunteers' learning includes differentiating between learning that is intentional (where learning is the object of activity) and incidental learning (where learning is a by-product of other goal-directed activity) (Duguid et al., 2013). The social and situated nature of learning and cognition and elaborations on the "relations between social and personal contributions to learning and development" (Billett & Choy, 2013, p. 266), such as the significance of individuals' emotional engagement in learning (Illeris, 2007), appear as theoretical contributions to emerging understandings of the processes and mechanisms of learning through work experiences, with implications for learning through volunteer work.

Of particular importance for the study of community volunteers' learning is the correlation between high levels of both individual and group learning and development and an organisation's "commitment to learning and social or caring objectives" (Elsdon, 1995, p. 120). In such organisations, volunteers' learning is found to be afforded by and occur through their engagement in collaborative activities in a supportive environment that enables: "friendship, reciprocity and trust" to develop, contributing to both individual and community well-being (Field, 2005, p. 30; Golding et al., 2021) and with an "emphasis on certain themes depend[ing] on the mission of the organisation" in which people are participating (Duguid et al., 2013, p. 239).

In a digital era, adult learners traverse and drawn on resources in online, offline and blended spheres as they participate in contemporary social practices (Erstad & Silseth, 2023), such as community volunteering. Research points to expanded opportunities for significant social learning afforded by digital information and communications technologies in civil society settings and highlights the important role played by voluntary groups and associations in community information communication and dissemination (Brown & Adler, 2008; Field, 2005; Kavanaugh et al., 2009). Informal learning about information technology is also regarded as a necessary corollary of the work of third sector community groups and associations in a digital society, where learning occurs in communities of interest and communities and networks of practice through mechanisms and processes of cognitive apprenticeship, distributed cognition, collaborative inquiry, and collective action towards achievement of agreed developmental goals (Merkel et al., 2005). In this theorising, knowing is situated, often distributed and "always mediated by artifacts", with knowledge linked to human agency in terms of "people's ability to act, participate, and make appropriate and informed decisions in *sociotechnical environments* [emphasis in original]" (Fischer et al., 2009 p. 77). This, in turn, is seen to contribute to building sociotechnical capital, a term used to refer to "productive combinations of social relations and information communications technologies" (Resnick, 2002, p. 649).

However, there is still relatively little known about the subjective experiences of learning among diverse volunteers in community-based sociotechnical learning and working environments, and in particular, how digital technologies interface with and impact volunteers' learning as they go about their work. Moreover, despite wide acknowledgment of the pervasiveness of significant and valuable learning in volunteer work, there is consensus in the literature that there is still much to be learned about the nature of adults' learning in diverse workplace settings (Billett & Choy, 2013) and in particular about the informal learning of volunteers (McGivney, 2006). This is especially the case for rural volunteers, who are even less likely than their urban counterparts to explicitly differentiate learning experiences from other volunteering activities (Kilpatrick et al., 2010). Further, volunteers' experiences of supporting others' learning – and concomitantly, learning about learning itself as a content domain – is not strongly thematized in the

literature. Indeed, rather than being identified as a specific, valued learning outcome in its own right, volunteers' learning about informal learning and teaching is often conflated with leadership, communication and interpersonal skills, self-efficacy, advocacy, community support, social awareness, and 'helping people' (Duguid et al., 2013; Kilpatrick et al., 2010). Therefore, investigating volunteers' learning about their own and others' learning, including the dynamics of guided learning at work (Billett, 2008) and "the invisible work of informal teaching" (Church et al., 2010, p. 138), are seen as central to understanding the full picture of adults' learning in volunteer work.

Research Context and Participants

GraniteNet is a rural Community Informatics project which began in 2006 as a Participatory Action Research collaboration between researchers from a regional university and members of a rural community located close to the border between New South Wales and Queensland, Australia, where it continued operating until 2018. Like Australia, many countries and communities have been working in recent decades on strategies to build the capacity of their citizens for active participation in work, civil society and lifelong and life-wide learning in the digital era. Such strategies include the Learning Communities movement, in which towns, cities, and communities adopt a "learning-based approach to community development…with a framework in which lifelong learning is the organising principle and social goal" (Faris, 2005, p. 31) and grass-roots community technology (Community Informatics) initiatives seeking to leverage digital technologies and the Internet to support the achievement of community development and digital inclusion goals (Gurstein, 2000). Informed by these principles, the GraniteNet project's vision was the development and implementation of a community owned, designed and managed online portal that would support individual and community development and capacity building (McLachlan & Arden, 2009). The adult learners in this context, ranging in age from 17 to 75 years, are local volunteers providing, and community members accessing, the organisation's digital inclusion services. The GraniteNet working-learning environment is both 'real' and 'virtual', comprised of a community technology centre, or hub, and a community web portal, both run by a voluntary management committee. This investigation into rural community volunteers' learning in the

blended Community Informatics and Learning Community initiative, focusing specifically on the experiences of learning from the volunteer learner-worker's perspective, tells us much about how this learning occurs, why it is particularly important and effective and the conditions under which it flourishes. It also sheds light on how digital technologies are implicated in, and impact on, volunteers' learning.

Research Design and Methods

A phenomenographic approach to investigating GraniteNet volunteers' experiences of learning

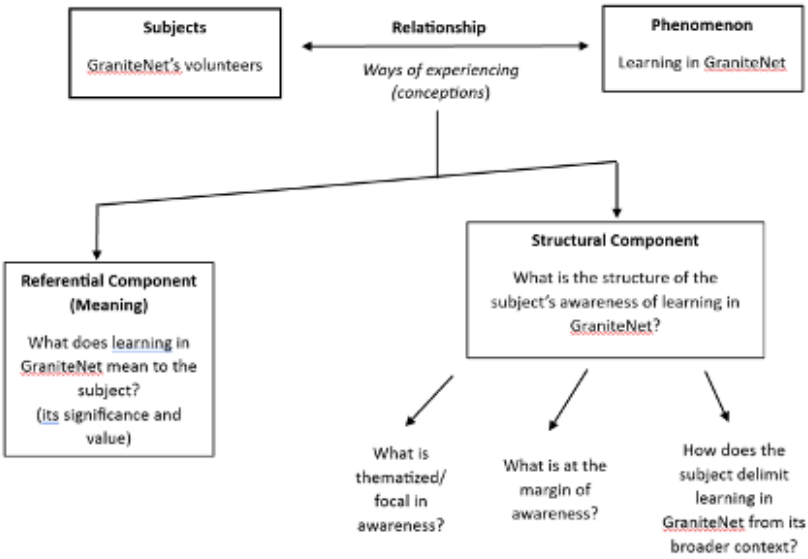
Phenomenography (Marton & Booth, 1997), a qualitative research approach to investigating learning from the learner's perspective, was selected to investigate variation in the ways that the GraniteNet volunteers experienced learning in the context of their volunteering work. Phenomenography reflects a broadly situated cognitivist epistemology that sees learning as individuals coming to know, understand and experience the world – and phenomena in and of the world – in newer and ever more complex, profound and complete ways (Marton, 1998; Marton & Booth, 1997). The focus is on identifying variations, rather than commonalities, in these understandings and experiences, with the characterisation "of a certain way of understanding a phenomenon (especially in relation to other possible ways of understanding the same phenomenon)", being of interest (Marton, 1988 pp. 180-1). For the purposes of analysis, a way of experiencing something is comprised of a referential and a structural component, which are said to be co-constitutive and "dialectically intertwined" (Akerlind, 2005 p. 70). The referential component refers to the meaning that the phenomenon has for the subject (for example, its significance and value), and the structural component "describes how relevant parts of the world are seen and are related" with reference to:

1. what is thematized or focal in [the participant's] awareness;
2. what is at the margin of awareness or in the ground; and
3. how the subject delimits or discerns the object from its context (Bruce, 1990, p. 6).

Figure 1 is a graphical representation of this relational perspective

applied to conceptualising and analysing GraniteNet volunteers' experiences of learning.

Figure 1: Referential and structural aspects of awareness of learning in GraniteNet



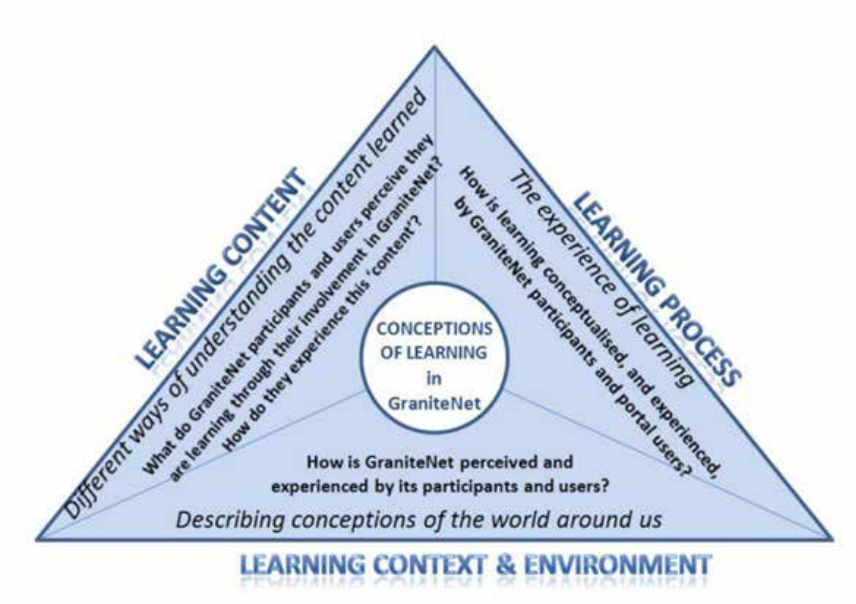
Using a structured phenomenographic interview procedure incorporating mind mapping, twenty GraniteNet volunteers' diverse ways of experiencing learning in the context of their volunteering were probed to illuminate three different learning aspects adapted from Marton (1988, p. 5):

1. The experience of the learning *process* (the learner's experience of how learning occurs)
2. Different ways of understanding the *content* learnt (the learner's experience of what is being learned)
3. Describing conceptions of the world around us (the learner's experience of GraniteNet as *the learning context and environment*).

Together, these provide an over-arching holistic conceptual framework for investigating the nature of participants' qualitatively different ways

of experiencing learning in GraniteNet. Figure 2 illustrates how the three learning aspects (content, process and context and environment) – incorporating both the 'what' and 'how' of learning as well as the context for learning – are seen to constitute, holistically, participants' conceptions and experiences of learning.

Figure 2: Conceptual and analytical framework for the study



In this framework, the scope of the content dimension of learning includes knowledge, skills, attitudes and literacies (with a focus on digital literacies) as well as personal development learning, learning to learn, learning to adapt to and manage change, and learning to negotiate life trajectories and manage life transitions (Illeris, 2007). The learning process is theorized with reference to how learning occurs and what makes this learning possible (or the mechanisms of learning (Sfard, 1998)), focusing on the learner's motivation or incentive, intentional experience (or noesis), and awareness, making a distinction between activities that have an explicit learning-related goal, and those where learning is a by-product of (or incidental to) other goal-focused activity. As previously noted, the GraniteNet learning environment is theorized as a sociotechnical learning environment, whereby "technological

artefacts are enmeshed in our activities and our connections to other people" (Tuominen et al., 2005, p. 339). A socio-technical environment is therefore an environment in which these relations and dependencies are thematised.

Sampling

The sample for the GraniteNet case study comprised 20 participants recruited from among the broader pool of volunteers, including 13 females and seven males, of whom seven were aged between 26-54 years, six between 55-64 years, four over 65 and three under 25 years of age. Three participants identified as being from a culturally and linguistically diverse background and two as having a significant disability. In phenomenography, the emphasis is on heterogeneity (rather than representativeness) of the sample (Akerlind, 2002). Therefore, the following volunteer sub-groups were targeted to maximise the diversity of perspectives and experiences:

- members of the GraniteNet Incorporated management committee
- volunteers involved in the day-to-day administration and delivery of services from the community technology hub delivering basic computer skills training to community members on-site, including a "Senior's Kiosk" service for older community members
- volunteers responsible for editing their community group's or club's web page on the GraniteNet community portal (known as "Content Editors"), and community bloggers (some online only, some both on-site and online)
- volunteers involved primarily in activities related to the administration of the GraniteNet community web portal (web administrators) and training of community group Content Editors
- other community users of GraniteNet's on-site and online services.

Former as well as current volunteers were included in the sample to maximise the trustworthiness of the data.

Data Collection and Analysis

On receipt of university ethics clearance, individual structured interviews of one hour's duration were conducted in private in a location of participants' choosing, recorded with their permission and transcribed. At the start of their interview, each participant was asked to draw two simple mind maps: the first of their perspectives and experiences of being a volunteer at GraniteNet, and the second focused specifically on "Learning in GraniteNet". They were then asked to "talk through" their mind maps during the interview. This approach precluded the need for initial direct questioning of participants about their perspectives and experiences, thereby eliciting participants' own elaborations of their mind maps. These elaborations were interspersed as required with the interviewer's prompts to probe concrete and reflective experiences and awareness of different aspects of a significant learning event or critical incident. Interview transcripts and mind maps were then subject to iterative stages of phenomenographic analysis following a systematic procedure synthesised from accounts in the literature (Akerlind, 2002; Bruce, 1990; Marton & Booth, 1997), with various ways of experiencing learning in GraniteNet identified in the data with reference to the study's conceptual and analytical frameworks. The phenomenographic data analysis process comprised the following steps as an iterative process:

1. inspection of individual interview transcripts to discover discrete ways of experiencing learning in GraniteNet with reference to qualitatively distinct meanings (referential aspect)
2. sorting of data extracts (quotations) into "pools of meanings" (Marton, 1998, p. 198), moving backwards and forwards between individual transcripts, mind maps and identified conceptions
3. focusing alternately on referential and structural components of awareness (see Figure 1) to illuminate dimensions of variation and differentiating conceptions based on these dimensions
4. gradual refining of conceptions into a "stabilised system of meanings" (Marton, 1998, p. 190) represented by a set of discrete and structurally related ways of experiencing learning in GraniteNet

5. devising and labelling categories of description with supporting quotes and mind maps representing the conception in each category and constructing the “outcome space” (Marton, 1998, p. 189) illustrating the categories and their structural relationships.

Findings and Discussion

Critical variations in ways of experiencing learning discovered in the data formed the basis for the consolidation of a set of seven qualitatively distinct, structurally related conceptions of learning in GraniteNet, reflecting the collective experience of the participant sample at the time of the research. These are now presented in the categories of description that constitute the study’s findings or 'outcome space', followed by a discussion. It is important to note that no single category or conception represents the perspective of any one individual participant; rather, the categories describe the range of qualitatively different ways of experiencing learning in the context of GraniteNet, reflected in the data, any number and combination of which may characterise an individual volunteer’s experience at the time. The findings are thus representative of the set of significant variations in the participating volunteers’ experiences of learning through their volunteer work, at the collective level. Therefore, when reading the findings, readers familiar with the field of volunteers’ informal learning in this context – either through lived experience as a volunteer or through research with community volunteers – will recognize meanings reflected in the data that are familiar to them as well as some that are new to them. What readers will not see in these findings are individual volunteers’ stories or narratives of their experiences of learning in their volunteer work.

Outcome Space: Seven qualitatively different ways of experiencing learning in GraniteNet

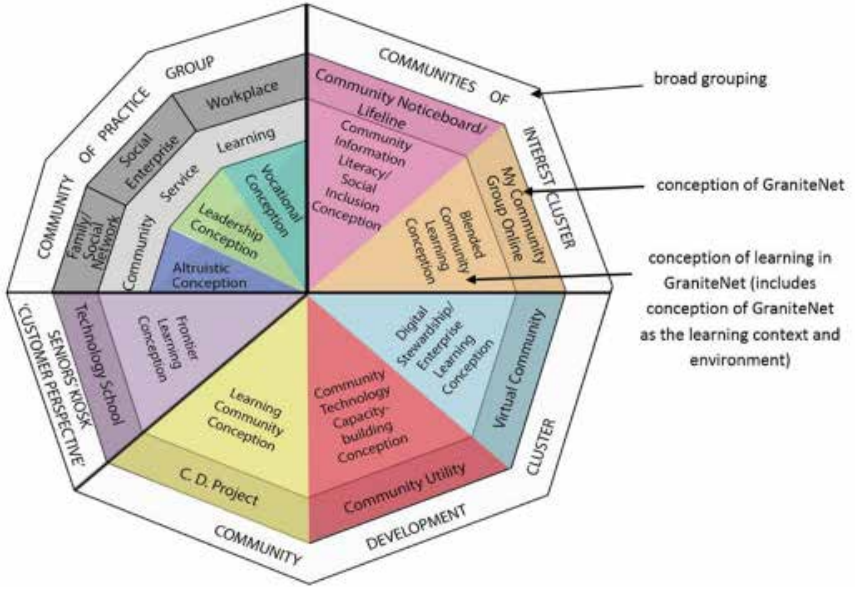
Learning in GraniteNet is variously experienced by volunteers as:

1. conquering a technology frontier (Frontier Learning conception)
2. contributing to a worthy cause (Community/Service Learning conception)
3. connecting with my community (Social Inclusion/Community Information Literacy conception)

4. interacting with the community in groups (Blended Community Learning conception)
5. creating my local community online (Digital Stewardship/ Enterprise Learning conception)
6. helping people learning to live in a digital world (Community Technology Capacity-building conception)
7. driving the lifelong learning community (Learning Community conception).

These seven categories of description coalesce into four distinct groupings, each of which reflects a particular perspective of GraniteNet as the learning context and environment: a Seniors Kiosk Customer Perspective (Category 1); a Community of Practice Group (Category 2) comprised of three sub-categories, each with a particular emphasis; a Communities of Interest Cluster (Categories 3 and 4); and a Community Development Cluster (Categories 5, 6 and 7). This categorisation of conceptions and groupings is presented in diagrammatic form in Figure 3, revealing critical variations in participants' ways of experiencing learning in the context of their volunteer work.

Figure 3: Variation in experiences of learning through volunteering in GraniteNet



The ways of experiencing learning in these categories and groupings are now explained, highlighting the structural relationships among the categories and supported with quotations from the interviews that articulate critical aspects of learning thematized in the conception in each category.

From learning as acquisition to learning as participation: The trajectory from frontier learning (Category 1) to learning as "a two-way street" (Category 2)

The object of activity in the Frontier Learning conception in Category 1 (Seniors' Kiosk Customer Perspective) is learning about and learning to use digital technologies in GraniteNet's physical space of the community technology hub, experienced as "conquering" a new frontier:

> *"Just keeping the brain alive and try to beat those nerves and take courage."*

GraniteNet is experienced as a dedicated learning environment in which the experience of learning is 'de-situated' from the authentic contexts in which the learning is to be applied and, as such, is experienced as the

acquisition of knowledge and skills:

> *"Somebody told me about GraniteNet…it's where you can go to get your learning – I call it school".*

The primary motivation or incentive for learning basic digital literacy skills is to communicate with family and reconnect with friends (social participation):

> *"There must be so many lonely people out there that really, like me, I was ashamed of not knowing anything. I would never ask for help. It's only the kids giving me this thing. I just had to do it".*

> *"The contact, being in contact with people."*

A growing awareness of the affordances of digital technologies for enhancing the quality of life of frail elderly people is also thematised in the data, reflecting an altruistic aspect that suggests an expanding awareness in the form of an emergent affiliation with GraniteNet's digital inclusion mission:

> *"If you had the opportunity, maybe you could teach someone… Help in a simple way. Not too much technology".*

In contrast, the experience of learning in the Community/Service Learning conception in Category 2 (the Community of Practice Group in Figure 3) is situated in the work experiences of a community of volunteers (which can be characterised as a community of practice with reference to Wenger (2009)), where the primary object of learning is building capability to be able to contribute to the helping work of the organisation. In the Altruistic emphasis, which is at the core of this conception, the motivation for participation in GraniteNet's volunteering activities is to contribute to the worthy cause of helping others (altruism) and social inclusion:

> *"All I knew was that I wanted to help, because I like being a volunteer, not just here, I just like being a volunteer, for a good purpose; a good cause. It makes me feel good to be able to offer these services".*

> *"Too many of them are scared and it's nice to see the joy on someone's face and the happiness when they say, 'I know how to*

do this; oh look—I can do this! Now can I learn that!".

As such, GraniteNet is experienced as a "family" and a "social network", with relational aspects of the learning environment thematized in which learning is experienced as reciprocal – *"a two-way street"* – reflecting a movement from the experience of learning as acquisition (in Category 1) to learning as participation:

> *"Learning here is all of us teaching each other and sometimes our clients accidently teach us, because we then have to think when they have a sticky question we don't know about…so along the way we all learn."*

The significance and value of incidental learning through 'teaching' others is thematized, along with learning how to 'teach' others digital literacy skills:

> *"I don't [know what I'm going to learn] until it crops up. The Android Tablet, I don't know how that works, but I will learn about that when it comes."*

> *"It comes down to their ability to learn really. I show them the way that I know, and they might not be able to grasp that, so I would have to think of a different way to teach them. We can't all learn the same way".*

Vocational learning

In the Vocational emphasis of the experience of learning in Category 2, the positive relational aspects of the work environment are also highlighted, with GraniteNet experienced as a *"friendly workplace"*, and the experience of learning characterised by a heightened awareness of instrumental learning linked to formal training and vocational goals:

> *"Because I'm also in a business admin course so everything that I learn in that also relates to what we do here".*

Learning "signposts" are provided in the form of feedback from co-workers and mentors and via reference to codified, vocational competencies linked to formal vocational education programs:

> *"I try and get as much feedback as possible in every aspect that I*

think I need to learn."

"I haven't done anything with computers before I started at a TAFE course, so it's interesting for me to see where I am in the region of computers".

"I don't know where I got the idea that I'm alright with that, except with people from here…my work fellows. Not the people who are here to learn. Obviously, I know more than they do."

This benchmarking affords what Eraut (2004) describes as "mutual enhancement through integrated learning", whereby:

> *[t]he more formal knowledge gained in working for a qualification is used to enhance the quality of ongoing informal learning in the workplace, while at the same time using the experience to modify that formal knowledge or make it more usable in yet other workplace situations (p. 67).*

Leadership learning

The experience of learning in the Leadership emphasis of Category 2 is collaborative, involving a strong identification with the organisation, and with both individual and collective learning experiences reflected:

> *"Learn to do things properly, how to run things and how to change the whole atmosphere. Learning that there are times that we really have to put our thinking caps on. That's when I realised the only way to go forward is to sort the mess out; is to know. And if I couldn't think of something, go and learn how."*

Identification with the organisation's "social and caring objectives" (Elsdon 1995, p. 120) along with a concern for its precarious circumstances as a *"risky business"* and a willingness to *"step up"* and take significant personal risks in the interests of the organisation's survival provide the catalyst for significant personal development and organisational leadership learning, confirming the findings of the aforementioned earlier studies:

> *"The major lift in self-confidence which I applied, when I was*

> *voted in as President. I recall that I was running around for about two weeks, saying "Oh my god, what will I do?" But in all honesty, it's drastically helped me to become who I am now and I'm very happy with that person".*

Learning about 'my community' and learning with others online: Community information literacy, blended community learning and distributed community leadership (Categories 3 and 4)

Contrasting with the conceptions of learning in Categories 1 and 2, which are epistemologically situated in the face-to-face environment of the community technology hub, the two conceptions in the Communities of Interest cluster in Categories 3 and 4 (see Figure 3) are characterised by a focus on activity situated in the virtual environment of the community web portal – the domain of GraniteNet's diverse communities of interest:

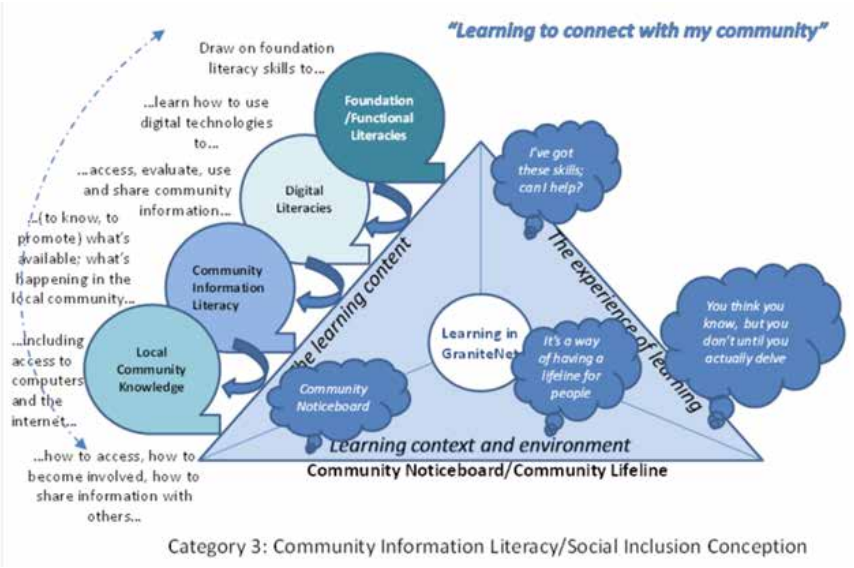
> *"For me, the biggest thing is the [GraniteNet] website and most of this all belongs to the website and that's the bit that interests me and the community groups are the crux of it".*

Focal in awareness is using digital technologies and specifically the GraniteNet community web portal to learn about, learn how to connect with and participate in the life of the local community, again revealing an altruistic motivation:

> *"A lifeline for people who maybe can't get out of their own home. What is happening in the world? It offers a way to communicate; it offers a way of getting information."*

Figure 4 is an example of how the discrete meanings and structure of awareness of the experience of learning discovered in the interview transcripts and mind maps – analysed with reference to the anatomy of experience in Figure 1 – were subsequently interpreted and mapped to the analytical framework in Figure 2 to enable determination of a distinct way of experiencing learning in this category with reference to the learning content, process and environment dimensions.

Figure 4: Example of mapping participants' conceptions of learning to the analytical framework (Category 3 – Community Information Literacy/Social Inclusion Conception)



Also in the Communities of Interest Cluster, the Blended Community Learning conception in Category 4 reveals an expanded awareness that includes a focus on enabling learning-focused online community interactions, distinguished from information dissemination:

> *"This is about learning activities as opposed to information. The Community Noticeboard is great for information, but if you want to know what activities can I get involved in…So it's a community of learners about a particular interest."*

There is also an emerging kind of community leadership role reflected in this cluster, which can be characterised as a community sociotechnical leadership practice, situated in the practices of the GraniteNet community group Content Editor role:

> *"That is where I think, instead of people sitting in little groups and saying, 'Okay we are just going to sit here and do what we like doing', to think more outside and how they can connect with others and then share their skills."*

> *"Linking the community groups with volunteers and people who are interested. Letting people know about all the different community groups here—both the local and new people in town."*

This is an example of the new opportunities for social learning and community participation afforded by digital communications technologies discussed earlier with reference to the work of Kavanaugh et al. (2009) and Merkel et al. (2005).

"Cultivating the possible": The community development cluster (Categories 5, 6 and 7)

The focus of learning in the three conceptions in the Community Development Cluster in Figure 3 is learning about how digital technologies can be used for community development purposes (that is, Community Informatics). The dominant learning metaphors reflect different conceptions of digital technologies and the internet, which are viewed variously as: *"a kind of gateway for the local community"*, affording entry into a *"new realm"* of local community life online (Category 5); a *"window"* between the world of the local, proximate community and the world *"out there"* (Category 6); and, in Category 7, as lifelong learning catalyst:

> *"So, on the one hand there's our opportunity to contribute to digital literacy, but on the other, is just to use GraniteNet as a mechanism and vehicle for a raft of learning opportunities".*

The experience of learning in the three conceptions in this cluster is coloured by imaginative problem-solving, experimentation and enterprise:

> *"So, it's trial and error; in reality, there is no perfect way to do it and I am not a genius at codes. I know people out there that will write a program and get it spot on the first time. I'm not one of them, so trial and error is a big part of it".*

> *"I felt very engaged…it's been a great experiment. Sometimes you're out there on a limb, not knowing if you should continue to drive it or just let it go. I guess we were like guinea pigs. We were just testing it out… and you have to be dragged along with the trial and error of things".*

> *"I have always been interested and involved in IT and have always dabbled in web development a little bit, for personal things. I think that what GraniteNet has enabled me to do is to take that to the next step".*

Bruner (2012, pp. 28-29) refers to these processes of "generating and testing possibilities" for change as "cultivating the possible", which he theorises – as informal learning – with the object of learning being to "open up realms of possibility".

Having presented an over-arching account of the phenomenographic outcome space, the focus now shifts to drilling down into the specifics of the "why, what and how" of volunteers' learning.

What are volunteers learning?

Analysis of participants' conceptions and experiences of what they are learning in the context of their involvement in GraniteNet reveals significant and valuable learning occurring in a diverse range of areas, confirming findings reported in the literature, but using "much more far-reaching categories" (Illeris, 2007, p. 74) to reflect the breadth and depth of meanings, understandings and dispositions inherent in participants' own expressions of their learning. Table 1 presents this learning content organised into seven content domains, mapped to their relevant categories in the study's outcome space in which this content is thematized in the data. It shows how GraniteNet's emphasis on certain themes reflects the organisation's altruistic mission as a community technology capacity-building project with a digital and social inclusion mission and a focus on promoting lifelong learning.

Table 1: Learning content across seven content domains mapped to conceptions of learning in the outcome space.

CONTENT DOMAINS	SPECIFIC CONTENT	CONCEPTIONS OF LEARNING IN GRANITENET
1. Technology/Sociotechnical	• Digital literacies (learning about and learning to use technologies for a range of purposes) • GraniteNet Content Editor Skill Set • Web design and development • Programming skills • Technology stewarding • Community Informatics	All categories Communities of Interest cluster (Cat 3 and 4) Digital Stewardship (Cat 5) Community Technology Capacity-building (Cat 6), Learning Community (Cat 7)
2. Community	• Participatory democracy • Civic engagement • Local community knowledge • Blended community learning • Distributed community leadership • Community development	Community of Practice group (Cat 2A, B, C) Community Information Literacy/Social Inclusion (Cat 3) Blended Community Learning (Cat 4) Community Technology Capacity-building (Cat 6), Learning Community (Cat 7)
3. Learning	• Learning about one's own learning (meta-learning) • Facilitating adults' digital literacy learning • Learning about one's own and others' community information needs (Community Information Literacy) • Blended community learning • Action learning/research • Lifelong learning	All categories Community of Practice group (Cat 2A, B, C) Communities of Interest cluster (Cat 3 and 4) Community Technology Capacity-building (Cat 6), Learning Community (Cat 7)
4. Special Interest	• Knowledge and skills in the specialised domain of the community of interest	Communities of Interest cluster (Cat 3 and 4)
5. Vocational	• Vocational competencies and literacies • Career development learning • Enterprise learning	(Community) Service Learning – Vocational Emphasis (Cat 2B) Digital Stewardship/Enterprise Learning (Cat 5)
6. Personal/Relational	• Self-efficacy/confidence • Personal agency/development • Generic skills and attributes (social competence, social awareness, communication, interpersonal and leadership skills)	Frontier Learning (Cat 1) Community of Practice group (Cat 2)
7. Organisational	• Organisational knowledge and know-how • Participatory democracy and governance • Organisational management and development	Community of Practice group (Cat 2)

Thus, as Table 1 shows, the findings reveal significant and valuable learning in the following three closely interrelated content domains to be reflected in all categories in the outcome space:

- Technology/socio-technical learning content, from basic digital literacy skills (Categories 1 and 2), information literacy (Category 3) and the GraniteNet Content Editor Skills Set and distributed community leadership (Category 4), to the more complex skills required for technology stewardship (Category 5) and leveraging digital technologies for community development (Community Informatics) (Categories 6 and 7)
- content in the Community domain, including local community knowledge (Categories 1 and 3); participatory democracy (Category 2); community information literacy (Category 3); distributed community leadership (Category 4); and community engagement and development processes focused on promotion of digital inclusion and lifelong learning (Categories 5, 6 and 7)
- learning about Learning as a content domain, including: learning about one's own learning linked to metacognitive and reflexive learning and learning about adults' digital literacy learning and how it can be facilitated (Categories 1 and 2); learning about one's own and others digital information needs (Categories 3 and 5); facilitating blended community learning (Category 4); and community engagement and development processes focused on promotion of digital inclusion and lifelong learning (Categories 6 and 7).

As such, learning content in the Technology/Socio-technical domain interfaces with content in the Community and Learning domains:

(i) reflecting the social shaping of technology through community (Wenger et al., 2009):

> *"For [Community Group D], I took it upon myself to create the webpage and to set it up and also to include a little bit of a pictorial …It was fun to do and a learning exercise for me. I just had fun putting it together and hopefully encouraging people to consider the [Community Group D] as something to come along and have fun with".*

(ii) illuminating the dynamics of "the invisible work of informal teaching" (Church et al., 2010, p. 138):

> *"When you are a volunteer and when you are helping somebody, believe it or not, you are the teacher. Therefore you are teaching that person and that person is learning… I find it more 'feel good' to learn with teaching".*

(iii) and reflecting a growing capacity among volunteers for metacognition and reflexivity in the interests of understanding and furthering their own learning:

> *"I learn more doing it for somebody else rather doing it for myself. It doesn't stick, up here in my brain, when I'm doing it for myself, but if I'm helping someone else out, then it sticks with me longer, if that makes sense."*

How are volunteers learning? Ways of experiencing the processes of learning

Analysis of participants' expressions of their experiences of the processes of learning reveals this learning to be first and foremost a function of social participation (Wenger, 2009) or interaction (Illeris, 2007) in the context of volunteer work in GraniteNet's hybrid socio-technical working/learning environments. For Wenger (2009, p. 210), social participation refers to "processes of being active participants in the practices of social communities and constructing identities in relation to these communities". This learning may be experienced as an individual or a collective phenomenon but is predominantly practical and relational in nature. Further analysis and synthesis of these learning processes as they are represented in conceptions of learning in the study's outcome space reveals seven primary learning processes, including five individual learning processes and two collective learning processes, as shown in Table 2.

Table 2: Individual and collective learning processes in GraniteNet

Individual learning processes	Practical learning-by-doing (intentional and incidental), implicated in all other learning processes
	Intentional learning through trial and error, experimentation, deliberation, problem-solving and reflection in and on action
	Learning through instructing, showing, helping, guiding and mentoring others (teaching digital literacy skills)
	Learning through observing, seeking feedback, benchmarking, appraisal and meta-learning
	Seeking, using and sharing information for learning in sociotechnical environments through exploration, navigation, discovery, problem-solving, experimentation, creation, construction, representation, reification and bricolage
Collective learning processes	Collaborative problem-solving, inquiry and action learning
	Blended community and network learning – communication, sharing/exchange, co-construction, cultivation, connection, networking

What makes this learning possible?

To answer the question about what makes learning possible for GraniteNet's volunteers, consideration is given to learning incentives (Illeris, 2007), learning mechanisms (subsumed as part of the learning process) (Sfard, 1998), and the interaction between the qualities the learner brings to the learning setting and the affordances of the learning environment (Billett, 2008). Illeris (2007, p. 26) notes that the experience of learning, including the content that is learned, is always "marked" by the nature of the learning incentive that has motivated the learner's engagement in learning, including the learner's attitude, motivation and volition. As the previous descriptions of the experience of learning in the seven categories in the outcome space show, family, organisational and community affiliation (membership and belonging), altruism (helping others), and learning opportunism (seeking out and taking advantage of learning opportunities to achieve personal learning goals) emerge in the data as significant learning motivators or incentives across all categories in the outcome space.

Subsumed under the umbrella of social participation, the data reveal five primary mechanisms of learning: communication, interaction, connection, information and exposure to variation. Of particular interest is learning through exposure to variation – referred to as variation theory of learning, whereby "discerning variation brings about learning" (Bruce, 2006, p. 6). This involves learners developing an awareness of how others see the world, and of others' experiences of the world and phenomena of interest, through interaction with different and familiar others and objects in face-to-face, online and blended environments, as illustrated in these quotations:

> *"Being at GraniteNet has made me see in myself, compared to what is here, where I am in the region of computers".*

> *"And of course, working with people say, like [Glen] and [Peter], I was always learning technical stuff because they obviously knew—they were both quite different—but they both knew completely different things from my experience, so I am always learning".*

> *"See how different communities give different priorities or different focus to supporting the kind of things we were doing in Granite Net… Figuring out what would and what wouldn't work in our community".*

Linked to the "learning opportunism" incentive discussed above, learning is also a function of individuals' own levels of personal agency, self-confidence, and self-efficacy—as qualities the individual brings to the learning setting—and the extent to which the working environment actively supports this kind of self-directed learning (Billett, 2008; Brockett & Hiemstra, 1991; Eraut, 2004):

> *"Just watching the people here that have been at GraniteNet before, observe what they are doing and how they have done it and give it a go, see my chance. At the moment, I'm still waiting for my turn—once my confidence is up."*

> *"It was good feeling like that you had a voice".*

However, "individuals' freedom and capacity to secure their intentions are limited by the activities their work enables" (Billett, 2008, pp.

40-41). Barriers to learning include those reported in the literature on learning in associational life and volunteer work related to what Eraut (2011, p. 192) refers to as "the allocation and structuring of work" (p. 192), whereby the fluid, and at times, ad-hoc nature of community organisations run entirely by volunteers can result in discontinuities in participation resulting in a disorganised working environment that can negatively impact on workplace learning opportunities:

> *"There is no paid employee; it's all relying on volunteers. As a new volunteer, it's really confronting in a way. You say, "My god, what's going on here? You have to figure it out yourself. So you either swim or sink."*

Conclusion

The above findings contribute to knowledge about the experience of learning in volunteer work from the learner's perspective, and specifically, learning embedded in social participation in rural community volunteering and associational life in the digital era. Based on these findings, the conclusion can be drawn that GraniteNet volunteers at the time of the study were experiencing significant and valuable learning through their workplace experiences that were not only serving an instrumental purpose in terms of being a means to a desired or valued end, but also the kind of learning that "furnish[es]… direct increments to the enriching of lives" (Dewey, 1916, 2008, Ch 18 Educational Values 2, The valuation of studies, para 2). The field of adult education practice embraces many different kinds of practitioner on a continuum from the full-time, professional adult educator to individuals whose vocational and community activities have implications for adult learning (Usher & Bryant, 1989). The findings reveal how GraniteNet volunteers perform a range of activities that have significant implications for adult learning, from teaching older adults basic digital literacy skills in a face-to-face, informal learning environment to facilitating community and network learning via sharing of information and knowledge in blended online and face-to face learning communities. Further, the significant educative effect of learning in participatory democracy, associational life and volunteer work reported in the literature and confirmed by this study's findings is shown to be further expanded through the "combination of digital interactions with offline

encounters" (Field, 2005, p. 148) afforded by GraniteNet's hybrid socio-technical working and learning environments. At its best, the affordances of GraniteNet for learning in community with others—and in the service of others—are realised through and leverage off the synergies generated by the alchemy of altruism, learning opportunism, exposure to variation, a strong sense of (local) community, an interest in digital technologies, a sense of shared purpose, and reciprocal learning and collective action nurtured in the crucible of a positive sociotechnical learning and working environment.

Related to this are new understandings and insights generated about learning through volunteering as a phenomenon linked to adults' growing capacity for metacognition and reflexivity in the interests of understanding and furthering their own learning. Most significantly, the findings reveal how, as community volunteers contributing to the organisation's digital inclusion work, adult learners themselves can exercise their agency to become experts in understanding and facilitating their own learning while also developing their capacities to support others' learning through the practice of doing so (Usher & Bryant, 1989), shedding light on the mechanisms through which adults' learning through workplace experiences in community volunteering contribute to their agency and lifelong learning while also generating wider collective benefits.

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Adult learners in police and technology work in Finland: Andragogical features behind learning at work

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As the learning needs of adults grow in the workplace and society, there is a need to understand the specificities of adult learning and how to support and guide adult learning at work. This article explores the applicability of andragogical theory to learning at work. The research seeks answers to the following question: What are the (individual and social) andragogical features behind learning at work? Two organisations – Finnish police and a technology organisation - participated in this study. Thematic interviews (n = 54) were analysed using thematic analysis. The findings showed that all the assumptions of andragogy were reflected in the data, but a substantial overlap existed in workplace learning situations. We identified three main themes describing the key andragogical features behind learning at work: benefit orientation, self-direction and experientiality. All the described key features showed both individual and social dimensions. The article presents these features in relation to different learning

situations at work, as well, as showing the contributions of the study for andragogical theory.

***Keywords**: andragogy, adult learning, workplace learning, police organisation, technology organisation, qualitative research*

Introduction

In contemporary society and the modern workplace, various social and technological transformations necessitate the acquisition of new competences and knowledge at a fast pace across both public and private sectors. There remains a need to comprehensively comprehend the distinctive characteristics of adult learners and how to effectively support and guide their learning processes within the workplace. Andragogy, which encompasses the theory of adult learning, offers an intriguing and pertinent foundation for apprehending adult learning within the framework of today's working environment. Although it is an established theory (Knowles, 1975), andragogy accentuates and develops contemporary facets of adult learning. It views adult learning as a functional, goal-oriented and self-directed process involving the ongoing construction of an individual's knowledge. This approach actively engages learners in diverse ways (Knowles et al., 2012; Kolb, 1984).

Since the early days of the development of the concept of andragogy, different schools of thought have developed around it, and andragogy has had different emphases at different times. Various scholars have taken a stand on andragogy and considered, even criticised, its applicability to adult learning theory. Merriam (2001) pointed out that andragogy has been described as a theory of both adult education and adult learning, a method of adult learning and a set of assumptions about the adult learner. This debate on what andragogy ultimately is continues and requires further clarification. At the same time, andragogy has been criticised for being individualistic and ignoring the sociocultural perspective. Indeed, in several publications on the subject, andragogy and the self-directed learning attached to it have been equated with, for example, autonomous learning in which individuals are responsible, autonomous and even robot-like in their own learning processes (Holec, 1981; Merriam & Caffarella, 2012).

Such criticism has led to improvements of the theory, but various

researchers have continued to describe the lack of empirical, especially qualitative, research in the field of andragogy (Knowles et al., 2020). This is because the studies that have been carried out have focused on quantitative methods and the examination of individual characteristics. At the same time, many theoretical papers and reviews have been written on this theme. The studies that have been conducted on the andragogical framework have focused on examining the applicability of andragogical methods to teaching and formal guidance situations (e.g., Birzer, 2003; Chan, 2010; Dirani, 2017; Tessier et al., 2021), although research from different learning contexts and environments can provide interesting insights into andragogy (Knowles et al., 2020). The current study responds to these perceived research gaps by examining the andragogical assumptions in two different work contexts: police work and technology work.

Workplace learning (Billett, 2014; Tynjälä, 2013) is a pivotal component for facilitating the adaptation to working life changes, upholding a competitive advantage and fostering skill development. While the study of workplace learning spans several decades (Tynjälä, 2013), andragogy has received relatively limited attention in the literature and research on workplace learning and workplace pedagogy, while in andragogy research, workplaces have been partly neglected. Considering the growing transition in workplace learning research from traditional on-the-job training to the examination of everyday workplaces, there is a broad consensus among researchers that relying solely on established formal training for skills development is no longer adequate for addressing the dynamic demands of the evolving work environment (Billett, 2020; Dochy et al., 2022). This study recognises the workplace learning framework, combined with the andragogical approach, as a valuable and comprehensive perspective for investigating the learning experiences of adult employees.

The study aims to provide insights into the effectiveness of andragogical theory in the context of workplace learning, making visible the individual and social dimensions of andragogy's assumptions about adult learners, particularly in workplace learning contexts. The study seeks to respond to the critique of the individualistic nature of andragogy research by asking the following question: What are the (individual and social) andragogical features behind learning at work? The research was conducted as a qualitative study in which thematic

analysis (Braun & Clarke, 2006) was used to examine descriptions of learning from interviews (N = 54) with employees and supervisors from Finnish police and technology organisation. We first describe andragogy's underlying assumptions about adult learners and adults' orientation to learning. We then present an understanding of learning situations at work based on previous research. Then, we present the research aims, questions, methods and findings. Finally, we discuss our findings in relation to the previous literature on andragogy and demonstrate the practical value of this study for organisations.

Andragogy

Andragogy is based on views about the characteristics of adult learners that distinguish them from children (Knowles, 1975; Merriam & Caffarella, 2012). From this perspective, andragogy has been described as a theory and a practice aimed at helping adults learn, whereas pedagogy focuses on describing the teaching and learning of children (Knowles, 1980). The focus of andragogy is largely based on the psychological definition of adulthood, which holds that adulthood is defined by the extent to which a person takes responsibility for their own life (Mezirow, 1990). Hence, andragogy is premised on the idea that adults who take responsibility for their lives can take responsibility for and control of their own learning (Knowles et al., 2012). Originally, andragogy posited that, unlike children, adults are motivated to learn through experiences, needs and personal interests; adults' orientation to learning is based on life domains in a broad sense; experience is the richest resource in adult learning; adults have a deep need for self-direction; and individual differences between people increase with age (Lindeman, 1926). Since then, the description of the relationship between andragogy and pedagogy has evolved: in later descriptions, andragogy and pedagogy have been seen not as opposites but as forming a continuum from teacher-centred guidance towards learner-centredness, (Canning, 2010; Knowles et al., 1998; Merriam, 2001). For example, Zmeyoy (1998) argued that andragogical perspectives can be used (regardless of the age of the learner) when short-term educational goals are to be achieved and learners have sufficient practical and social experience, are aware of their goals and can apply their existing skills and abilities and have a sufficiently strong background in the subject matter to be taught.

Over the years, Knowles and his research team have formulated and developed an andragogical model based on six assumptions about adult learners (Knowles, 1975, 1980, 1989; Knowles et al., 1998; Knowles et al., 2020, pp. 43–46), which are:

1. **Need to know.** Adults want to know why they need to learn something before they learn it. When adults commit to learning something, they invest a lot of energy in exploring the benefits of learning.
2. **The learner's self-concept.** Adults have a self-concept that they are responsible for their decisions and their lives. Once they have achieved this self-concept, they develop a deep psychological need to be treated by others as capable of self-direction.
3. **The role of the learner's experiences.** Adults have a wider range of experiences than adolescents or children simply because they have lived longer. The quality of their experiences is also different from those of children. There are also large individual differences in the experiences of adults.
4. **Readiness to learn.** Adults are prepared to learn the things they need to know to cope effectively with real-life situations. Developmental tasks that move from one stage of development to another are a particularly rich source of learning readiness. The key here is that the learning situation is temporally consistent with the learner's stage of development (i.e., the learner has already developed sufficient skills to learn the subject at hand).
5. **Orientation to learning.** Adults are oriented towards learning in a task- or problem-based (commonly called life-based) way. Adults are motivated to learn when they understand that learning will help them complete tasks or solve problems that they will encounter in life.
6. **(Internal) motivation.** Adults are motivated by some external motivators (e.g., a better job, benefits, a higher salary), but the motivators with the utmost potential are intrinsic (e.g., improving quality of life, increasing job satisfaction, and developing self-esteem).

While the assumptions of andragogy have garnered some acceptance among researchers, they have also faced substantial criticism from

experts and scholars (Holton et al., 2001). Notably, a major point of contention revolves around the criticism that andragogy, especially in its emphasis on self-direction, fails to adequately account for contextual and situational factors that influence individual learning processes. In some publications, andragogy-based adult learning has been equated with autonomous learning, where individuals are perceived as solely responsible, autonomous and almost robotic in their learning endeavours (Holec, 1981; Merriam & Caffarella, 2012). However, critiques of andragogy and adult learning as overly autonomous and individualistic (Baskett, 1993; Boucouvalas, 2009; Hiemstra & Brockett, 2012; Merriam, 2001) have prompted an increasing emphasis on sociocultural elements in research. This shift acknowledges the importance of the learning environment, the broader context, interactions and the roles played by various actors in adult learning (Lemmetty, 2020; Baskett, 1993; Bell, 2017; Hiemstra & Brockett, 2012; Foucher, 1995; Kessels & Poell, 2004).

Thus, there is a growing recognition of the sociocultural nature of andragogy, which is increasingly regarded as a holistic approach that combines individual factors and actions with environmental and interactional elements (Author, 2020). It is also worth noting that Knowles did not perceive andragogy as an entirely individualistic phenomenon. Boucouvalas (2009) pointed out that Knowles's book (1975) may inadvertently convey such an image, as it does not present a critique of individualism. According to Boucouvalas, Knowles's (1975) descriptions of self-directed adult learning have been misconstrued. Nevertheless, the individualistic perspective has been reinforced by scholars such as Noe and Ellingson (2017), who argued that self-directed learning by adults in the context of work-based learning should be voluntary rather than managed or guided by formal HR rules or organisational policies. Scholars have also posited that employees engage in learning not because of predetermined objectives but due to their active participation and desire to learn (Garaus et al., 2016). However, individualistic perspective contradicts the idea that learning – especially in the context of work - is framed by many structural and cultural elements and it is fundamentally collaborative and interactive (Dochy et al., 2022). The absence of a social perspective becomes particularly apparent when considering andragogy in the context of workplace learning.

Workplace learning

The examination of andragogy together with the theoretical framework of workplace learning has been limited in previous studies, although it could be an appropriate way to strengthen our sociocultural understanding of the assumptions of andragogy. Workplace learning has been referred to learning that takes place at work and during or for work (Billett, 2014). Typically, it has been seen as a practice-based activity which emerges when individuals engage and participate in different occupational practices in the community (Billett 2020). It is thus seen as an activity directly derived from the characteristics of the work processes and their inherent social interaction (Poell, 2014) as well as the agency of the learners themselves. In this context, workplace learning can be conscious or unconscious learning that arises from the needs of the job, involving not only the acquisition of skills and knowledge but also their application (Leslie et al., 1998). Equally, learning in everyday work can be unintentional and highly contextual, and its outputs are often not known in advance (Tynjälä, 2013). Therefore, it is thought that learning at work is not guided by systematic, organised support (Hoekstra et al., 2009). However, Billett (2014, 2020) has pointed out that the different learning experiences that emerge in the context of work practices may contain pedagogically relevant features that can be guided and organised. Several studies have described workplace learning as related to problem solving situations, everyday developmental work and other (collaborative) daily activities (Janssens et al., 2017; Kyndt et al., 2009; see also e.g., Brockman & Dirkx, 2006).

As a practice, workplace learning has been often approached by looking at individual or collective learning practices which emerge in multiple daily situations. For example, Jeong et al. (2018) approached workplace learning in their study as an individual learning process that is strongly embedded in everyday work activities, based on tacit knowledge, spontaneous and unconscious, intentional, goal-oriented, and planned or unplanned. Individual learning practices include experimentation, reflection, making mistakes and acquiring knowledge (Carbonell et al., 2014; Schei & Nerbo, 2015). By contrast, collective or interactive practices have been described as, for example, discussion in which experiences and views are exchanged with others (Margaryan,

2019; Schei & Nerbo, 2015). Asking for help while problem solving and observing someone else's work and applying what is observed to one's own work are also seen as collective learning processes (Brandi & Christensen, 2019; Schei & Nerbo, 2015), as are various guidance and coaching situations, either between members of the work community or with an external expert (Lemmetty, 2020; Janssens et al., 2017; Kyndt et al., 2009; Schei & Nerbo, 2015).

Learning at work is thus a multidimensional phenomenon that can be viewed as individual and social practices emerging in different work situations. Studies have typically approached workplace learning by looking at the factors that facilitate learning, the learning processes and practices, or the outcomes and consequences of learning (e.g., Tynjälä, 2013). This study focuses on workplace learning situations as contexts for adult learning – as processes or spaces in which individual and collective learning practices occur. In locating learning situations, this study draws on above mentioned notions of workplace learning, where learning is seen as based on, for example, problem solving, collaboration and developmental work.

Research aim and questions

This study responds to the lack of empirical and qualitative analyses on andragogy by examining the assumptions about the adult learner in the context of work. It also responds to the critique of the individualistic nature of andragogy research. The study examines the learning experiences of police and technology workers from the perspectives of andragogy and the workplace learning framework. The study aims to provide insights into the effectiveness of andragogical theory in the context of work, making visible the individual and social dimensions of andragogy's assumptions about adult learners in workplace learning contexts. The main research question for the study is as follows:

- What are the (individual and social) andragogical features behind learning at work?

In addition, we formed two underlying questions to guide the preliminary analysis of the data: What kinds of workplace learning situations are described in the learning experiences of the participating employees? What kinds of assumptions about adult learners are reflected in the learning experiences of the participating employees?

Methods

The study employed a qualitative research approach through interviews. The choice of qualitative interview research as the methodological strategy was driven by the objective to elucidate the nature of the phenomenon under investigation within a specific context (Hammersley & Atkinson, 2007). Qualitative research places a strong emphasis on capturing various descriptions and narratives related to the phenomenon under examination. As Bodgan and Biklen (1997, p. 6) articulated, the qualitative research approach operates on the assumption that nothing is inconsequential, as every piece of information has the potential to offer valuable insights for a more comprehensive understanding of the subject under investigation.

Participating organisations

Two different Finnish organisations were chosen as the target organisations for this study: a technology organisation and a police organisation. The selected organisations are exposed to changes in working life and society, which can be seen as generating continuous work-based learning needs for the personnel. Working and achieving high-quality results in both sectors require strong skills and expertise that need to be maintained through daily learning at work.

In the technology organisation involved in this study, about 450 people are employed in various expert positions, such as software developers, IT experts, knowledge management specialists, and supervisors. The organisation specialises in industrial solutions, software development, BI services, cloud services, IT services, and related support and maintenance services. In recent years, it has grown rapidly in terms of operating profit and the number of employees. In the technology field, digitalisation is causing numerous changes in the uses of technology. Furthermore, because of the organisation's continuous growth, changes in the organisation's structures have been widely discussed.

The second target organisation of the study is a police organisation, specifically the Preventive Policing Unit in Finland. In total, there are 30 senior police officers and their supervisors working in this unit. Preventive police work aims to proactively deter criminal activities, enhance security and build public trust in law enforcement. Unlike

emergency response and certain other areas of police work, preventive policing places less emphasis on the traditional chain-of-command guiding structure. In this context, it is vital to view preventive policing as expert work in which self-direction among police officers, interdisciplinary collaboration, and situational problem solving, whether individually or within a team, hold paramount importance.

Data

Interview data (n = 54) were collected from the participating organisations. The interviews were individual thematic interviews in which the themes were as follows: learning at work, organisational support for learning, self-direction and problem solving. The interviews were carried out during autumn 2020 and spring 2021 and they lasted from 30 to 60 minutes. In the police organisation, the interviews took place at the police station. In the technology organisation, the interviews were conducted remotely using Teams software. The interviews were carried out as part of a larger leading sustainable learning (JOKO) research project (Unversity of Jyväskylä, 2023) by four different interviewers, two of whom are the authors of this article.

The interview framework was designed to guide the different interviewers in going through the themes relevant to the study. During the interviews, the participants were asked to tell about their own work, their educational and work history, the learning and problem-solving situations they encountered at work and the factors that were relevant to them in these situations, as well as their own and others' roles and responsibilities in these situations. In addition to their general views, we asked the interviewees to share their experiences using as concrete examples as possible. The audio-recorded interview data were transcribed verbatim.

Analysis

The analysis of the research data was carried out in three stages. Thematic analysis (Braun & Clarke, 2006) was used as the analytical method. Prior to the analysis phases, all the interviews were read through by all of the three researchers who are the authors of this article. In the next phase, two of these researchers focused on a deeper and more specific reading of the data: one researcher focused on the

police interviews (n = 26), while the other focused on the interviews collected from the technology organisation (n = 28).

In the first step of the preliminary analysis, each interview was carefully reviewed while locating all the learning-related situations described by the interviewee. In locating the learning situations in the data, the characteristics describing learning practices and contexts previously identified in the workplace learning research (Dochy et al., 2022; Carbonell et al., 2014; Kyndt et al., 2009; Schei & Nerbo, 2015) were used. In this phase, we used the following question to guide our examination: what kinds of workplace learning situations are described in the learning experiences of the participating employees? In the next phase, these situations were again examined for descriptions that could be interpreted as assumptions about adult learners. To support this phase, we used the six assumptions presented by the theory of andragogy (Knowles et al., 2020), the expressions of lwhich we looked for in the interviewees' descriptions of their experiences. The guiding question for this phase was as follows: what kinds of assumptions about adult learners are reflected in the learning experiences of the participating employees? The descriptions found were separated from the overall data into a separate table and categorised according to the six theory-based assumptions.

Once all the interviews had been preliminarily gone through and the expressions that emerged had been tabulated (43 pages), the analysis moved to the next stage. In this stage of the main analysis, we used data-driven thematic analysis (Braun & Clarke, 2006) to answer the main research question of the study (Table 1).

Table 1: Examples of the thematic analysis process of the study

Quotation (description of the learning experience)	Andragogical assumptions (subtheme)	Descriptive feature (main theme)	Workplace learning situation (background context)
"If you jump into a project with new technologies, it is likely that you will have to learn something new [in order to carry it out]."	Need to know	Benefit orientation	Problem-solving situations, new claims, and unexpected challenges
"I find myself facing a new challenge or problem [at work]. Planning [and solving] them is a good way to learn through work."	Problem-based learning orientation		

The descriptions entered into the table were examined in more detail, looking for what kinds of similarities and differences could be observed from the assumptions appearing in the descriptions. We combined assumption descriptions expressing a similar underlying orientation towards learning under a more general theme that made visible the central feature describing the emerged assumptions. Thus, we acquired three different main themes that made visible the most central features that guide and support learning at work. After that, we went through the individual and social dimensions of the descriptions within each main theme, which allowed us to describe the contents of the theme in more detail. Finally, we looked at which specific workplace learning situation in each theme was most typically contextualised in the experiences of the participants.

Findings

Five different situational contexts were identified from the participants' workplace learning experiences: new projects and the changing claims of work, problem solving and challenges, guiding oneself and others, networking and teamwork, and role changes. All six assumptions about the adult learner described in andragogy theory (Knowles et al., 2020) were strongly reflected in the data of our study. However, the empirical data from the technology and police organisations showed that the assumptions strongly overlapped in the above-mentioned workplace learning situations. Thus, through the analysis, we were able to form three main themes describing the andragogical features behind learning at work. According to this research, in workplace learning situations in the police and technology fields, adult learning was guided, directed and supported by benefit orientation, self-directedness and experientiality. All of these appeared not only as individual but also as social starting points for learning. Next, we present these main themes and their

individual and social dimensions as well as the workplace learning situations in which they were typically reflected in the data (Figure 1).

Benefit orientation

The andragogical assumptions related to the *need to know* and *problem-based* orientation appeared empirically as interconnected, which can be called the benefit orientation of the adult learner. It means that learning is driven, guided or initiated by a real need, and through it, an understanding of the benefits of the learning situation.

From the point of view of benefit orientation, learning at the workplace was described in the data primarily through its occurrence in everyday work scenarios. It was closely related to various problem-solving situations, challenges and demands that arose in working life, which were necessary for the efficient performance of work. From this perspective, problem-based orientation and the need for knowledge seemed to overlap and co-occur in the data: the descriptions of the learners' approaches to the learning situations as problem-oriented also illustrated actors' possibility to see the reasons and consequences of learning. The benefit orientation appeared in the work context as a built-in feature of problem-based and unexpected learning situations:

> *There are always some unexpected situations. I find myself facing a new challenge or problem pretty much every month, if not every week. Planning them beforehand and then making the best possible decision is definitely a good way to learn through work. (Technology Specialist 2, man, director, senior).*

At the individual level, the benefit orientation towards learning was reflected in the concrete, practical and immediate benefits of what was learned in current work and projects. At the individual level, it was seen in terms of coping with work situations and, for example, developing one's own skills. At the social level of benefit orientation, benefit was seen as broader, communal: the creation of wider value, such as high-quality products, practices or outcomes, whose impact extends beyond the individual to the organisation, colleagues or customers:

> *It's through learning that we try different things [to solve the problems], and if they work and are good, they become practices and they are used; they can even become national practices.*

(Police Officer, 6, woman, senior police officer, senior).

For example, the police officers described preventive policing as being problem solving itself: they ended up in problem-solving situations when they participated in unexpected social debates, received tips for their investigations and prepared for different events. In the police officers' descriptions, preventive work was constantly evolving, which automatically provided a reason for learning. In addition, the police officers described their desire to see the results of their work to reinforce the feeling that the development process was producing the intended effects and outcomes. The following police interview quote shows that learning is based on a real future situation. As such, its benefits and significance are already foreseeable and serve as an orientation for learning:

> *Actually, [learning takes place] by looking ahead: that next month, there will be a demonstration, so you start to build it from small pieces. (Police Officer15, man, senior constable, senior).*

In the technology sector, new software, platforms, techniques and technologies inherently generate real-life learning situations with clear benefits. At a general level, the technology experts also described their work as a continuous learning process involving development tasks and organisational changes in which theory must be combined with practice and new challenges were often unexpected.

> *Every time you jump into the unknown [in the workplace], how you . . . learn from it how to deal with the customer in the best way is quite interesting learning. (Technology Specialist, 7, man, project manager, senior).*

> *If you jump into a project with new technologies, it is likely that you will have to learn something new [to carry it out]. (Technology Specialist, 5, man, team leader, senior).*

Self-direction

Similarly, *self-concept* and *intrinsic motivation* are strongly linked, as motivation is both a prerequisite for the realisation of self-concept and its outcome. Based on the data, self-concept and intrinsic motivation

described the employee's ability for self-direction (i.e., the ability to make decisions in everyday life while being active and taking responsibility). Thus, self-direction in this context seemed to be an approach as adults in the workplace actively engage and participate in learning situations when they are motivated and have a strong self-concept.

Self-direction is especially attached to problem-oriented situations of learning at work, but it also relates to independent and communal learning situations in which the learning practice involves guiding one's own or others' work and helping with it. These seem to be fundamental starting points for taking responsibility and being active, which can be referred to as an adult learner's self-direction. Strong self-direction, by contrast, appeared to increase engagement, commitment and individual-driven motivation for learning situations. Learning was thus necessary to overcome problems, but it became engaging and productive if it was personally meaningful to the individual:

> *Learning [at work] depends very much on what interests you or what you want to invest in. (Police Officer, 21, woman, senior constable, senior).*

> *You need to plan and think for yourself what issues you want to tackle and what issues you want to solve . . ., how I want to present things, so I can pretty well decide for myself what I think is good, and that is motivating. (Police Officer, 17, man, senior constable, senior).*

Especially police officers were unanimous, for example, in their belief that personal motivation and interest were necessary to their job and that motivation was primarily based on a desire to help people and influence society. Particularly in relation to preventive policing, the respondents were motivated by opportunities for development work and trying new things. By contrast, the job was also described as requiring responsibility, critical examination of alternatives and the courage to make decisions that they considered right. Preventive policing provided opportunities for development and learning through independent decision-making:

> *[It motivates you when] you get to play with your own ideas, try different things and develop. It's fun in its own way. (Police*

Officer, 6, woman, senior constable, senior).

However, also people working in the technology sector talked about motivation in terms of personal desire, interest and even passion for learning, realisation and deep thinking. They stated that learning provided inspiration, experiences of success, a sense of accomplishment and, more generally, a "good feeling," which made it intrinsically motivating.

Self-direction also appeared to have a social dimension. In this case, the motivation behind self-direction was not only personal meaningfulness but also the feeling of being part of a group. In particular, collaborating with colleagues and experiencing a sense of community were viewed as valuable and motivating factors for learning:

> *Every person needs the same things: to belong to a group and feel valued. These are basic needs. (Technology Specialist, 22, woman, HR-director, senior).*

> *The work community [motivates]. We certainly feed off each other, even if we don't initially see things in the same way. (Police Officer, 20, man, constable, junior).*

Both in the technology sector and the police, the need to belong to a group and be appreciated by others was regarded as a fundamental human need that work was expected to fulfil.

Experientiality

Experiences and *readiness to learn* also seemed to be related. Experiences were described as a key factor in creating learning readiness. Thus, *experientiality* can be seen as a characteristic of an adult that includes both elements: experiences and readiness to learn. Experientiality therefore means a starting point for learning, where previous experience can be used and applied, but where work also provides suitable learning experiences through which employees' readiness for new things is built.

The various work scenarios were interconnected and consequently formed learning paths and contexts, equipping individuals with experiences and enhancing their abilities. The desire to enhance one's own actions, career and performance in the workplace or to gain

a deeper understanding fostered the preparedness to acquire new knowledge. However, this readiness was closely tied to acknowledging one's own gaps in learning, such as seeking assistance from a colleague when uncertain and recognising the need for external expertise. In both instances, the typical real-life situations that triggered the learning process involved career advancement or transitioning to a different role, as well as adapting to changes and updates in job responsibilities or work practices. The professionals in the technology sector also highlighted a readiness to transition between jobs that may arise with age and experience. Furthermore, this eagerness to learn was fostered by shifts in employees' personal interests:

> *If I was here at the age of 25, I would not have been ready for it . . . If I was under 30, I would not have been ready to be a manager! (Technology Specialist, 16, man, project manager, senior).*

While the professionals in the technology field emphasised the integration of past experiences with newfound knowledge, individuals within the police organisation highlighted the importance of personal interpretation to discern relevant information from the irrelevant. Those in the technology sector sometimes described learning interactions as debates in which differing perspectives were exchanged. By contrast, the police officers elaborated more on their experiences and discussions, emphasising the significance of their encounters in the learning process. Both the police officers and the technology experts recognised the value of previous experiences gained from studies, work and general life as valuable resources for learning. However, the police officers specifically emphasised the significance of personal life experiences and their application as a learning resource. Personal experiences were regarded as a form of cumulative learning, drawing upon knowledge acquired from foundational training, professional experiences, and hobbies, as well as both work and personal life situations. This learning process involved learning from mistakes, engaging in self-reflection and repeating tasks. By contrast, the professionals in the technology sector also acknowledged the potential drawbacks of experience, such as falling into routines and repeating familiar patterns, as well as the difficulty of deriving new insights from them. As Technology Specialist 11 noted, "it is really hard for people to learn from something they have been doing for a long time." The significance of becoming familiar with new concepts and

persisting in the learning process through experience was also evident in the descriptions provided by the police officers:

> *I have been involved in various national groups, […], and cooperation groups – a lot of them. And through that, I have gained a broad view of how these things work, and that is where the greatest lessons are learned today. (Police Officer, 12, woman, chief inspector, senior).*

The social dimension of experientiality was particularly evident as shared experiences, which were regarded as beneficial, facilitating a comfortable environment for seeking assistance and support. Working in isolation was deemed impractical, while cooperation was deemed essential. The experiences of others were described as being utilised in both target organisations through joint problem solving, discussion and assistance, as well as by following the examples of others. Asking a more experienced colleague in everyday situations as well as at learning events was mentioned very often, and networking was perceived as essential for learning on the job and developing one's own expertise.

> *We try to have both more experienced designers and junior-level people in the teams so that knowledge is shared in everyday life. (Technology Specialist, 15, customer manager, senior).*

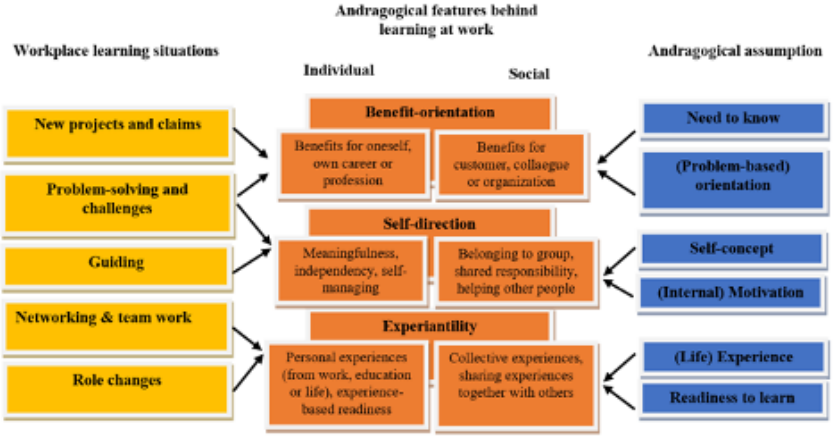
> *It [knowledge] does come from everyone's experience and familiarity; some of it comes from certain sources. (Police Officer, 25, man, senior constable, senior).*

Consequently, in the context of experientiality, learning became an inherent and inevitable outcome of work interactions, often occurring subconsciously. The value of being part of a group and collaborating actively engaged individuals in the learning processes.

Summary of the findings

In this research, we looked at the andragogical features behind learning at work. We found three main themes describing the key features: benefit orientation, self-direction and experientiality. The findings of the study are presented in Figure 1.

Figure 1. Andragogical features behind learning at work.



The andragogical assumptions related to the need to know and problem-based orientation appeared empirically as interconnected, which can be called the benefit orientation of the adult learner. This starting point was particularly evident in the experiences of the interviewees regarding learning situations related to problem solving and new kinds of claims, projects and challenges. Similarly, self-concept and intrinsic motivation were strongly linked, as motivation was both a prerequisite for the realisation of self-concept and its outcome. These seemed to be fundamental starting points for taking responsibility and being active, which can be referred to as the adult learner's self-direction. Self-directedness was emphasised not only in problem-solving situations but also in learning situations where the focus was on guiding and helping one's own work or that of others. Experiences and readiness to learn also seemed to be related. Experience was described as a key factor in creating learning readiness. Thus, experientiality can be seen as a characteristic of an adult that includes both elements: experiences and readiness to learn. In the interviews, experientiality particularly came to the fore in learning situations where the focus was on teamwork or networking, as well as in various role changes. All the described key features revealed both individual and social dimensions.

Discussion

When the assumptions of andragogy are examined in the context of

work, andragogy theory aligns closely with the theory of workplace learning. Moreover, based on our study, connecting these two frameworks – andragogy and workplace learning – it was possible to construct a picture of andragogy more as sociocultural rather than individualistic, as the theory's social and communal dimensions become apparent. This empirical research contributes new insights to the field of workplace learning by highlighting three andragogy-based principles that guide the actions of adult learners: benefit orientation, self-direction and experientiality in learning.

However, the primary contribution of this research is directed towards the field of andragogy research and literature. First, the study highlights the overlapping nature of andragogy's assumptions (Knowles et al., 2020) in the context of workplace learning, consolidating our theoretical understanding. From the interview data, it was possible to locate these overlaps and, on this basis, to describe the assumptions outlined earlier more concisely through three key themes (Figure 1). The three themes provide a more appropriate structure for examining the characteristics of the adult learner at work and for exploring and developing pedagogical practices that reflect these characteristics. Second, according to this research, the assumptions of andragogy theory emerge as empirically central to the context of workplace learning, reinforcing the role of andragogy even in situations detached from adult education. Third, the study's identification of the social dimensions of andragogical features, a facet previously absent from andragogy's assumptions, underscores earlier criticisms that accused andragogy of overlooking sociocultural, interactional and environmental contexts (Holec, 1981; Merriam & Caffarella, 2012). This research sheds light on the social dimensions within andragogy, thus bridging the gap concerning prior studies that have emphasised sociocultural perspectives and have contributed insights into sociocultural aspects. These social aspects encompass the significance of the learning environment, the broader context, interaction and the involvement of various actors in adult learning (e.g., Lemmetty, 2020; Baskett, 1993; Bell, 2017; Hiemstra & Brockett, 2012; Foucher, 1995; Kessels & Poell, 2004). This study underscores that the role of sociality as a guiding and orienting force in adult learning should not be dismissed in andragogical approach.

While in education it would be important to build andragogical starting points for experientialism, self-direction, and benefit orientation, in

workplace pedagogy these seem to occur almost naturally in the contexts of this study. Technology work and preventive police work are perceived by interviewees as meaningful and as work that benefits others (such as clients), with opportunities for taking responsibility and actively guiding one's own learning. Moreover, by embedding the learning process in concrete problems and project situations, the benefits are clear. In addition to the practical experience gained, the interviewees felt that they could also draw on their other life experiences. To understand the social dimensions of andragogy, it is essential to understand the role of others (colleagues and clients) in motivation development. Similarly, experientiality in andragogy should be understood not only as an individual's personal experience but also as a group experience, where sharing experiences is more central than having them. Based on the identified three key themes that provide a concise framework for understanding adult learners in the workplace, this study suggests that organisations can utilise andragogical principles to design effective learning programs that leverage existing knowledge and foster problem-based learning. While Noe and Ellingson (2017) argued that self-directed learning for adults should be voluntary and not managed or guided by the organisation's formal HR rules or policies, our study emphasises the need for organisations to consider the use of individuals' experiences, understanding the individual and social factors behind self-direction and motivation as well as to make the benefits of learning visible for employees.

Given the inherent characteristics of qualitative research, the present study does not aim to generalise information; instead, it endeavours to provide descriptions of individuals' actions within a particular context (cf. Hammersley & Atkinson, 2007; Levitt et al., 2017). The current research was carried out in two organisations to maximise the comprehensiveness and depth of the interview data. However, it is important to note that the findings are based on the data only from two contexts, which raises questions about their applicability to other types of organisations or those operating in different sectors. Additionally, it is worth mentioning that the study included participants with diverse job titles. However, their descriptions were not filtered through their specific roles, leading to a partial oversight in terms of the roles of job tasks in relation to learning. However, we attempted to increase the trustworthiness of this research by, for example, considering research

ethics and factors related to the study's reliability at every phase and in every decision made. We have emphasised the thorough description of the data collection and analysis processes in the reporting of this study, as well as providing data-based quotes and excerpts in the text to validate the interpretation of the findings (cf. Lincoln and Guba, 1985). The findings are presented clearly, and we have paid attention to the scientific and topical relevance of our sources. At the outset of the study, the participants were thoroughly informed about the research and gave their voluntary consent to participate. We anonymised the identification of the target organisations and individual respondent data to ensure that the respondents cannot be identified in this research report.

In further research, it would be interesting to explore the ways in which people working in different industries experience these andragogical features. An approach that also asks directly about the lack of features, for example where learning situations lack self-direction, where benefits are difficult to perceive or where experientiality is not present, would be key to providing a more comprehensive picture of workplaces as andragogical environments and also their shortcomings. It is important to investigate andragogy from the perspectives of individuals in various roles, considering the potential differences among them. In essence, further research is needed to explore the application of andragogy in different work contexts and to examine the effectiveness of andragogical guidance and teaching methods.

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Vocational learning of incident commanders in tunnel fire safety work

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Fire and rescue operations in tunnels constitute unusual and complex working environments for first responders. The ability to make correct decisions, based on the tunnel's specific characteristics, demands well-trained incident commanders equipped with sufficient knowledge and skills. The potential catastrophic consequences of tunnel fires have increasingly become a societal concern, with a growing demand to increase safety and emergency response management in European tunnels. However, from the incident commanders' perspective, learning in tunnel fire safety remains a relatively unexplored area. The current learning activities for tunnel fire response are limited and place no specific requirements on the content, instructional techniques and necessary level of competence. Designing learning activities requires careful consideration of what, why and how learning occurs. To enhance incident commanders' competence and ensure adequate emergency response during incidents in tunnels, the European Commission recently supported the development of an educational programme. As part of this programme, a pilot course was developed for incident commanders and carried out in Stavanger during the fall of 2021. The designers had a strict focus on parameters enhancing

learning, based on a vocational learning model. This article presents the design and results from the pilot course and the mechanisms that are most likely to promote and inhibit learning. Results show that learners must be engaged in activities that emphasize problem-solving abilities and critical reflection, to enhance their ability to make sense of complex situations and subsequently act effectively. Furthermore, sharing experiences requires an open atmosphere of communication and the encouragement of creativity.

***Keywords**: incident commander, tunnel fire safety, pilot course, vocational learning, competence*

Introduction

The major fires in road tunnels at the turn of the millennium (e.g., the Mont Blanc tunnel 1999, the Tauern tunnel 1999 and the St Gotthard tunnel 2001) demonstrated that tunnel fires have the potential to develop into critical events with catastrophic consequences for road tunnel users and first responders (Voeltzel & Dix, 2004). These experiences are important and influence the understanding of potential events that might also strike fire and rescue personnel responsible for emergency response in Norwegian tunnels. Even though there are 20 - 30 fires and near fires in Norwegian road tunnels annually (there are approx. 1250 tunnels in Norway), these are rarely complex or with high heat release rates. Over the last 15 years, an average of one major fire per year has occurred in Norway with the potential for becoming a major accident (more than 5 people killed). Thus, these experiences as well as potential worst-case scenarios make a range of contributions to fire and rescue personnels' ongoing learning and competence development, and they must therefore be adapted and transferred to the personnel through workplace related activities. The adaption and transfer of knowledge and experiences might be facilitated using tools that combine challenging mechanisms of tunnel fires in local tunnels, involving the relevant personnel being responsible for the emergency work.

Currently, we see worldwide that the dynamic tunnel fire safety situation places huge demands on the competence of first responders and especially on those in charge of emergency response activities. Proper tools to ensure sufficient competence enhancing works within the

emergency services are lacking. Furthermore, to our knowledge, the use of such tools in a system of didactic activities and learning processes is hardly documented in any scientific publications.

It is generally agreed that fire and rescue personnel's competence is both a universal imperative and an area of current improvement. However, it appears that the absence of tunnel fires with cascading effects and fatalities generates ambivalent attitudes amongst stakeholders, which has diminished the political community's consideration of the risks related to major tunnel fires. From the perspective of learning and competence development within the fire and rescue services, tunnel fire seems to be an underestimated phenomenon. The local fire departments are left with the responsibility for establishing adequate principles, methods and content for the tunnel fire safety learning and training of their personnel (Bjørnsen & Njå, 2019).

During the study design, we elaborated on what were the personal and collective legacies of the learning and development arising across the professional incident commanders' working lives, that we could employ in the learning process. We furthermore explored how the workplace experiences could be enhanced to achieve positive outcomes for the incident commanders in terms of their work-life capacities that are often novel and challenging involving road users and other third parties. A particular interest within this field is the concepts, practices and traditions that arise from practices themselves and how learning through occupations can best be understood and promoted (Billett, 2010).

This article aims to present the results from a pilot course developed for incident commanders involved in tunnel fire safety work and discuss the mechanisms that are most likely to promote or inhibit their ongoing learning and development. The work behind the pilot course was an integral part of the European Commission (EC) founded project (SAFEINTUNNELS) in the field of vocational education and learning aimed at enhancing fire and rescue personnels' occupational capacities and ensuring adequate performance during incidents and fires in tunnels. The project was the starting point of the normative research work reported in this article. Our major research issue was:

- How can workplace learning activities successfully be designed to enrich learning outcomes and enhance fire and rescue personnels'

competence in tunnel fire safety?

As a course developer, the first author designed the course to emphasize problem-solving abilities, critical reflective thinking and creativity focusing on incident commanders' roles and responsibilities during emergency responses in local tunnels. Effects from the pilot course are presented and discussed based on empirical data derived from participant observation, plenary evaluation, questionnaire responses and semi-structured interviews.

We employed a design science approach to adapt and transfer experiences into settings of learning processes. Design science aims to construct models, methods and implementations that are innovative and valuable (March & Smith, 1995). Principles of design science have been applied in many fields, including architecture, engineering, education, psychology and fine arts (Cross, 2001). For instance, Abrahamsson (2009) studied how methods for risk and vulnerability analysis and the evaluation of emergency responses should be constructed to prevent, mitigate and prepare for future emergencies. In the present context, a course work for incident commanders within the fire and rescue services was developed and organized for those responsible for many complex tunnels in Norway.

Design science as a premise for utilizing experiences in learning

We applied design science methodology, with the purpose of (a) supporting the design of an artefact (learning tool) to enhance incident commanders' competence in tunnel fire safety, (b) generating methodological instructions for the iterative development and evaluation of the artefact's performance, and (c) providing context-specific knowledge by reflecting on the design experiences. Thus, the scope of the design process was: *building* and *evaluating* a new artefact, where "*building is the process of constructing an artefact for a specific purpose, and evaluation is the process of determining how well the artefact performs*" (March & Smith, 1995, p. 254). In the design and development of an artefact, the designer is mainly concerned about "*how things ought to be – how they ought to be in order to attain goals and to function*" (Simon, 1996, p. 4). The interrelation between participants' experiences and how learning is achieved guided our work.

The starting point of the work was Bjørnsen et al.'s (2023) analysis of first responders' competence regarding tunnel fire safety. This analysis revealed three major dimensions in the competence domain of first responders' tunnel fire safety work: i) *emergency response and tunnel system knowledge*, ii) *practical tunnel condition knowledge*, and iii) *theoretical (physical and behavioural) knowledge*. The study results indicated that practical tunnel condition knowledge and specific knowledge of safety levels in tunnels, and how safety systems are maintained and operated is scarce amongst fire departments and first responders. When choosing response actions to combat major tunnel fire scenarios, only a few incident commanders showed situation-specific assessments and judgements that went beyond the established procedures. Further, situational uncertainties were comprehended and appraised in a variety of ways, and the first responders' understanding of which strategies and tactics should be prioritized during the different phases of the emergency response varied significantly.

Abrahamsson's (2009) process model to design science influenced our methodological approach. Figure 1 illustrates the process and differentiates between three fundamental phases: (1) development, (2) test and evaluation, and (3) results and improvements. This is an ongoing process in which improvements by enhancing competence amongst the first responding units, either being the road traffic management centre, emergency services or other entities.

Figure 1. Process for designing the course, adapted from Abrahamsson (2009)

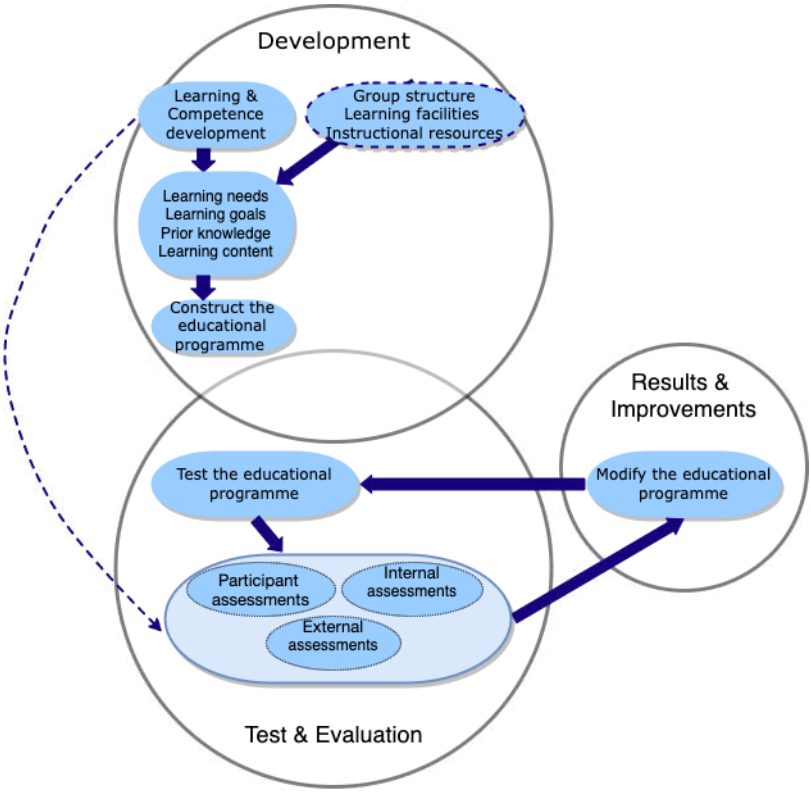

Figure 1 also structures the remainder of this paper, in which we present the learning tool we developed, and how we organised the course execution and the evaluation activities (section 2). In section 3 we provide the evaluation results and recommendations for future improvements. Further, in section 4 we provide a summary of important results.

Developing the course

Incident commanding is seen through the lens of "The seven-stage model", which is a decision-making model adopted by Norwegian fire departments for the management of emergency response situations (Mattsson & Eriksson, 2017). The seven stages emphasize: (1) assessing

the situation, (2) identifying measures, (3) establishing operational goals and tactical plan, (4) organising command scene and resources, (5) communicating and collaborating, (6) assessing available resources, and (7) evaluating effects of implemented measures. All these stages will come into play in complex tunnel fire incidents and associated responses.

The purpose of the artefact was to address learning and enhance incident commanders' competence in tunnel fire safety. We further broke this down into criteria operating the artefact (Gregor & Jones, 2007). This included comprehension of incident commanders' specific set of attributes (i.e., knowledge and skills) that they bring to the job, their experiences, the particular characteristics of the job, and the situations in which they act. We also consulted relevant research findings and their theoretical underpinnings (see Sommer et al., 2013; Bjørnsen et al., 2023; Bjørnsen et al., 2022).

Learning within the fire and rescue services involves two different processes at once: 1) an internal psychological process of acquisition and elaboration where new knowledge and information are accumulated, combined and gradually refined through critical reflective thinking, and 2) an external process of interaction and participation in work-related activities (Sommer et al., 2013; Bjørnsen et al., 2022). Hence, both socio-cultural aspects and individual cognitive aspects need to be considered to fully understand how fire and rescue personnel learn and develop competence. Sommer et al.'s (2013) model of learning in emergency response work builds on a combined approach to learning, i.e., *individual cognitive approach to learning and a socio-cultural approach to learning* and serves as a guideline for course development. In this article, we briefly introduce the learning model.

The learning model includes six interrelated elements: *contents, context, commitment, decision-making and response, reflection* and *the outcome of learning* (Sommer et al., 2013). For individuals to become professionally capable, the literature proposes that the contents of learning should comprise domain specific conceptual, procedural and dispositional knowledge (Billett, 2009). *Contents* refer to the phenomena, theories and practices being taught. Learning occurs not just in an individual's mind but in association with the context and the social groups in which they are involved and with which they identify

(Lave & Wegner, 1991). *Context* represents the social interactions and environment in which the learning activities take place. Individuals' involvement in learning activities have a strong influence on what is being learned, or if learning occurs at all (Illeris, 2010). *Commitment* relates to fire and rescue personnel's motivation and involvement in the learning activities. A further assumption is that these stimuli situations (i.e., content, context, commitment) should trigger *decision-making* and *response* in terms of mental simulations and actions in real-world contexts. *Decision-making* and *response* is associated with fire and rescue personnel's performance under the influence of contents, context and commitment in training situations. *Reflection* is widely recognized as a key element for individual learning and a powerful tool to enhance the ability to learn from experiences (Boud et. al, 1996). Lastly, the *outcome of learning* is expressed as *changes* in structures, behaviours or working methods, *confirmation* of existing knowledge and procedures/ working practices and/or *comprehension* of established practices, behaviours, etc. Recently, the model was evaluated and the relationships and interactions between its elements assessed (see Bjørnsen et al., 2022). Results provide empirical evidence confirming the explanatory power of the theoretical model in the context of learning within the fire and rescue services and demonstrate that reflection stands out as the strongest predictor for the outcome of the learning process.

The design of the course focused on instructional techniques that promote critical reflective thinking, problem-solving and creativity during the practical exercises (see Bjørnsen et al., 2022). The instructional techniques were further combined with personal experiences and constructed events (that also provide experiences). Table 1 presents the learning goals.

Table 1

Learning goals

Categories	Learning goals
Participant knows	• The tunnel's infrastructure • Implications for road users' possibilities of evacuation • Various methods to acquire situational awareness
Participant can	• Plan a safe response operation considering the tunnel's infrastructure • Implement measures that safeguard the self-rescue principle • Gather information, interpret information and anticipate the likely development of the situation
Participant masters	• Limitations and opportunities related to response operations considering the tunnel's infrastructure and characteristics of the situation • Decisions related to safe implementation of measures and tactical plan • Communication of situational awareness and tactical instructions

The type of competence required to perform adequately during emergencies varies with the complexity, the time restrictions and the expected level of interaction between first responders. Bloom's (1956) taxonomy of educational objectives was the framework for designing and organizing the learning goals. The categories are progressive sequences of educational objectives, ranging from a simple level of cognition (i.e., know), to a higher level of abstraction (i.e., master). To derive the necessary competence of incident commanders, the categories were further interpreted through Rasmussen's (1983) model of human behaviour. The model distinguishes three levels of human performance: skill-, rule- and knowledge-based. At the skill-based level, behaviour is guided by stored patterns and pre-programmed instructions that represent sensory-motor performance during activities. Rule-based behaviour is applicable during familiar situations in which solutions are oriented towards the goal and controlled by a set of rules which has proven to work successfully in previous situations. The knowledge-based behaviour is activated in unfamiliar situations when proven rules do not fit and actions must be selected using a conscious analytical process and stored knowledge. Incident command requires decision-making, problem-solving, testing solutions and generating a series of tasks and actions to cope with the situation. The primary objectives of the course (at skill, rule and knowledge behaviour levels) were directed towards developing incident commanders' capability to interpret limitations and opportunities in their working environment and implement appropriate decisions and response actions.

One aim of the course design was to engage all participants by providing relevant knowledge and experiences through a mix of theoretical lectures and practical exercises. Current learning practices have

traditionally been focused on developing personnels' basic knowledge and skills, which are essential for becoming a member of the firefighting team. However, a common belief is that theory is the preserve of the academic domain and practice that of practitioners (i.e., firefighters). The course adopts a blended learning approach integrating practice-based experience and theoretical knowledge.

To ensure theoretical anchoring and significant learning mechanisms, each of the learning model's elements was operationalized in the design of the course. The idea was that this would give opportunities for engaging in and learning new stimuli and experiences and subsequently enhance participants' work-life capacities. For instance, the theoretical lectures introduced knowledge about the tunnel's safety designs, risks and uncertainties encountered in tunnel fire responses and how different phases of emergency response should be approached by the incident commander. Further, the practical exercises consisted of scenarios of actual tunnel fire events and participants were encouraged to critically think through the consequences of their decisions and choices of action.

Testing and evaluating the course

The three-day pilot course (the artefact) was carried out in Norway during the fall of 2021. In total, eleven incident commanders, representing full-time and part-time fire departments, five instructors and two external evaluators participated. The course sessions were structured as a combination of theoretical lectures and practical exercises.

During response operations in tunnels, the incident commander is the nominated on-scene leader and is responsible for situational assessment and decision-making under time pressure and major uncertainties (e.g., number of road users inside the tunnel, traffic picture, fire substances, etc.). Their performance is therefore of utmost importance for the outcome of the emergency response. Considering that the participants were all leaders responsible for complex tunnels in their regions, the course designers expected a high degree of motivation and willingness to involve themselves in the learning activities.

For the practical exercises (i.e., role-play exercises and tabletop exercises), the participants were assigned specific roles (i.e., incident

commander and operational commander) and divided into two separate groups, consisting of five and six participants. The role-play exercises were physical and held outdoors in a training facility illustrating the context of tunnel fire responses. Further, the tabletop exercises were organized as structured discussions of tunnel fire events by using digital tools and descriptions to address scenarios' dynamics, in which the region's tunnels are based on the context. Scenarios ranged from simple incidents that slightly challenged the response capacity to complex incidents that extended beyond the local fire department's response capacity and required collaboration with the entire emergency response system.

To facilitate progress and trigger discussions during the practical exercises, each group was assisted by two instructors. The level of the instructors' involvement was to monitor responses, inject event variations and interject questions to ensure that issues critical to the exercise were discussed. To offer insight into other roles and perspectives, the participants were requested to rotate within assigned roles. The roles of incident commander and operational commander differ in responsibilities and tasks. For instance, the incident commander is responsible for strategic judgements and must organize the overall command structure for the response operation, whereas the operational commander must prioritize information gathering, communicate situational awareness and establish tactics for the response operation.

To support participants' reflections on their performance during debriefings after the role-play exercises and discussions during tabletop exercises, elements from Gibb's (1988) reflective cycle were utilized. If participants stopped discussions, the instructors prompted them into discussion with the following questions: Describe the situation and actions you engaged in. What was challenging about the situation? What sense can you make of it? What else could you have done? These questions appealed to participants' feelings, thoughts and suggestions for future actions.

The course was continuously monitored and assessed to generate modification and refinement of the artefact. Aiming to examine learning effects from the pilot course, a questionnaire was administered, and participants were requested to report their assessments of learning

outcomes (see Table 2). The questions introduced a five-point Likert scale, ranging from 1 (very small degree) to 5 (very high degree) and included:

- To what degree will the course contribute to changes in behaviour and working methods?
- To what degree has the course confirmed your knowledge, skills and practices?
- To what degree has the course contributed to deeper understanding of important issues related to tunnel fire responses?
- To what degree has the course increased your competence?

The first author also carried out semi-structured interviews to provide more comprehensive descriptions. Based on Sommer et al.'s (2013) theoretical framework for learning in emergency response work, an interview guide was developed. The indicative questions addressed the learning model's six dimensions (i.e., *contents, context, commitment, decision-making and response, reflection* and *the outcome of learning* in terms of *change, confirmation* and *comprehension*). The interviews were audio-recorded and transcribed and lasted between 32 and 55 minutes. Participation was voluntary and anonymous. All eleven incident commanders agreed to participate in the study.

Results and improvements

Through participant observation, plenary evaluation, questionnaire responses and semi-structured interviews some key findings have emerged about: 1) course execution, 2) pilot course's impact on learning outcomes, 3) learning supporting experiences, and 4) mechanisms inhibiting learning. These findings include inferences about how the process of learning was influenced by the design of the artefact.

Course execution

The first day started with theoretical lectures introducing the tunnel fire safety prevention work, the current regulations and how these affect safety systems in tunnels. The idea was to construct a knowledge basis that gives insight into the tunnel's emergency response plans and

risk assessments during tunnel fire responses. Further, two role-play exercises conducted in real-time settings, in the field, with operational personnel executing their functions and using relevant equipment were carried out. These exercises were designed to demonstrate difficulties in executing response strategies and tactics. During these exercises, we observed that critical cues and uncertainties were uncovered and clarified unsystematically within the firefighting team while the incident developed and some participants had trouble performing at the expected standard level and maintaining control over the situation. Triggered by the exercise-related factors, these participants were exposed to a variety of emotional challenges, which later influenced their learning.

On the second and third day of the course, participants were gradually introduced to new reinforcements, in terms of more theoretical lectures and tabletop exercises. The current learning activities seem to underestimate the value of reflection and the participants are usually taught a certain pattern of actions for responding to simulated events during training exercises. To stimulate critical reflective thinking and engage in problem-solving, tabletop scenarios were typically formulated as narratives of potential tunnel fire events that progressively increased in complexity. The scenarios unfolded in well-known tunnels and encompassed authentic situational descriptions that challenged the participants to utilize their existing knowledge to explore and think creatively and construct new knowledge and skills for responding to the presented events.

Pilot course's impact on learning outcomes

To capture the effects of the pilot course on participants' learning outcomes and competence development, a questionnaire was administered. In general, participants reported great efficacy of the learning experiences for each measurement scale. The greatest effects were found for comprehension and competence development. Table 2 summarizes the answers collected through this questionnaire.

Table 2

Assessments of learning outcomes and competence (N=11)

Item	Assessments
Changes in behaviour and working methods	Moderate degree = 1; High degree = 4; Very high degree = 6
Confirmation of existing knowledge and practices	Moderate degree = 1; High degree = 5; Very high degree = 5
Comprehension of tunnel fire response practices	High degree = 4; Very high degree = 7
Increased competence in tunnel fire safety	High degree = 3; Very high degree = 8

These measures delineate factors that are directly linked to the outcome of learning. However, the interviews provided insight into participants' learning experiences beyond the assessments reported in the questionnaire. During the interviews, participants expressed changes in mindset, experiences and working methods. A common feature emphasized by participants was an increased awareness of the complexity that tunnel fires represent and the importance of having sufficient knowledge of the tunnels in their field of responsibility. Some reported that becoming acquainted with the contents of the tunnel's emergency response plans was a main priority when they returned to work. Others conveyed that the course triggered their interest in searching for additional knowledge to further develop their repertoire of response actions and decision-making skills. As one participant said: "The course has increased my awareness that we have several tunnels at risk in our district and that I have to be better prepared to be able to deal with incidents when they occur. I can't continue hoping that incidents won't occur on my watch."

Since all participants lacked experience with major tunnel fires, it seems that the tabletop exercises provided new experiences of relevant aspects and phenomena that should be considered during response operations. For example, concerns were addressed regarding the predefined ventilation strategy and road users' behaviour. As one participant expressed: "Inflicting smoke on people and expecting them to evacuate long distances uphill is a hopeless scenario. This would be a crisis for us. One needs to possess knowledge to dare to go against the fixed protocols; hopefully, after such a course, some of the incident commanders will dare to do so." Participants also expressed thoughtful consideration regarding interagency collaboration to investigate the type and severity of the incident and formulate an appropriate response. The role of the Road Traffic Centre (RTC) was particularly pointed to as essential for facilitating information gathering and acquiring situational awareness. Changes in working methods were described in terms of

more active involvement with the other emergency response services to gather risk critical information for establishing operational priorities and ensuring the availability of resources in the earliest phase of the response.

Expressions of confirmation were associated with the participants' existing knowledge and the fire department's response practices. Discussing collective response actions and which aspects of the situation are most significant was regarded as highly valuable for confirming that the situation was interpreted correctly and that appropriate actions were prioritized. The majority described the practical exercises as confirming their work practices and ways of thinking. Perhaps most importantly, the group agreed that the "The seven-stage model" offers an appropriate methodology for the management of tunnel fire response operations. Nevertheless, many regarded the model as theoretical and stated that a thorough presentation of its methodology would have been beneficial before the execution of the role-play exercises.

Other expressions of confirmation were related to new insights emerging from the theoretical lectures and discussions during the tabletop exercises. These insights served as a kind of positive reinforcement of the participant's existing knowledge. For instance, it was well known that response operations in tunnels represent a high-risk working environment for fire and rescue personnel. New appreciations were uncovered in terms of the durability of breathing air, access to extinguishing agents, as well as the risk connected to rockslide and back-layering during firefighting operations.

Comprehension was related to a deeper understanding of tunnel fire phenomena and insights into how road users' behaviour may affect the response operation. For example, in the event of a tunnel fire, the tunnel's emergency response plans require road traffic operators to launch radio instructions for safe and prompt evacuation. Some participants stated that, depending on road users' location in the tunnel and the tunnel's design, different evacuation behaviour is needed and the information may be ambiguous. They explained that, in single bore bi-directional tunnels, the information conveyed should contain a clear message to avoid road users who have passed the fire scene turning their vehicles and getting trapped in smoke. Similarly, in twin bore unidirectional tunnels, the information should prevent road users from

turning their vehicles and hindering access to the emergency response services. Generally, the more participants knew about such aspects in different kinds of situations, the better prepared they felt to face potential events. As one participant said: "The course has given me more detailed knowledge about the tunnel's construction, the implications related to road users' behaviour and the importance of collaboration with road traffic operators. Now, I feel better equipped and more in control of issues that we might face. Through automating some actions, capacity is liberated to focus on specific aspects of the situation, which otherwise wouldn't have been captured."

Learning-supporting experiences from the pilot course

A common feature was that the contents of the learning activities provided knowledge and experiences relevant to the incident commander role. While the theoretical lectures introduced facts, principles and concepts, the practical exercises were situated in the local context of the fire department, that is, adapted to the specific challenges that participants may encounter in tunnel fires. The assessments revealed that the local knowledge emphasis was of great value and offered authentic opportunities to engage in decision-making and response actions. The participants agreed that solving realistic problems in well-known tunnels helped to visualize the situation and enhanced their understanding of how different choices of action (i.e., choice of access route, allocation of resources, location of command scene) can influence the outcome of an incident.

An important prerequisite for learning was adequate participation motivation. Results suggest that the motivational condition was met and that participants were motivated to learn because they considered the learning activities highly relevant to their occupational tasks. Some were relatively new in the role of incident commander and enthusiastic to be part of a project for vocational education in tunnel fire safety. As one participant explained: "It's only a question of time before a major incident occurs in our tunnels, and now I feel more comfortable with the thought of experiencing such an event. Instead of entering the situation with uncertainty, I will be more committed, trusting my knowledge and capability to stand my ground."

A fundamental factor promoting involvement in learning activities was a

high level of trust between participants and instructors. When selecting instructors, the designers assumed that, while external instructors might possess more didactic skills, internal instructors would better understand the needs of the group and promote a safe forum for discussions. During the interviews, participants described a non-threatening learning environment, with no risk of embarrassment or interpersonal discomfort when collectively discussing choices of action to solve specific problems. Since they all knew each other and there were no "real" consequences for making mistakes or saying something inappropriate, they felt that the discussions allowed creativity and the testing of different solutions.

The use of the training facility and relevant equipment during the role-play exercises made it possible to achieve realistic challenges, and participants experienced the context of learning as similar to real-world situations. For instance, the command scene was established at some distance from the tunnel's portal and the incident commander did not have direct visibility of the incident scene or face-to-face dialogue with the operational commander. The exercises were designed so that communication and exchange of information were only allowed through radio devices. Results demonstrated that participants faced high workloads and communication challenges, as well as difficulties with the command handover, transfer of information and the achievement of common situational awareness. Moreover, incorrect use of radio operating frequencies, difficulty in managing information overload and the necessity for leader support were identified. Participants highlighted the need for leader support and argued that they cannot perform at the expected level of quality without assistance. One participant described always being alone in the vehicle on the way to an incident, and that, in this phase, they too often become preoccupied with the execution of less significant tasks (i.e., handling radio devices, localization and navigation).

Mechanisms inhibiting learning and recommendations for further improvement

In general, the amount of subject knowledge taught was considered appropriate. However, some participants reported that they would have preferred more theoretical knowledge about how to approach tunnel fire situations before the execution of the role-play exercises. Within

the current design of the course, the transition from instruction in the classroom to execution of physical role-play exercises was considered too abrupt. To provide a better foundation for engaging in practical exercises, the revised version of the course should also introduce a systematic review of "The seven-stage model", preferably with exemplifications of how the methodology can be incorporated into the current response practices.

Tunnel fire responses are normally joint-effort work, involving several emergency response services (i.e., fire, health, police, road traffic and emergency operators). Responding to major tunnel fires requires this variety of actors to work together and share knowledge, often outside their familiar structures. This part of the response and the interagency collaboration were not captured in the design of the course. In all instances, contacts and communication with other emergency response services were simulated by instructors. Thus, opportunities to test the collaboration and communication between the various agencies were not provided. The assessments emphasized that collaboration across agencies is an important issue that needs to be incorporated into the future design of the course. This will offer opportunities to test communication, exchange experiences, increase shared knowledge of plans and procedures, and identify potentially different understandings of responsibilities. As one participant said: "It is implicit in the design of the course that the involved actors understand and use our terminology and communication means and provide correct information. Often in real-life situations, none of these things work. The course should reveal important disconnects and differences in interpretations. Otherwise, we train under the wrong premises." To improve the design of the course and enhance the quality of learning, representatives from the tunnel emergency response system should be invited to participate in the course.

Learning is a continuous process that extends beyond the context in which the knowledge is initially learnt. However, it is not obvious how the participants will integrate the learning outcomes into their vocational practices. As the major aim of the course is to lead to improvements in work situations (i.e., tunnel fire responses) and enhance incident commanders' competence, the revised design should provide time and space to discuss the application of learning outcomes in the current work practices.

Reflecting on the learning experiences through discussions was an important aspect accounted for in the design of the course. Results indicate that tabletop exercises can be powerful tools for learning if appropriate attention is given to incorporating cognitive processes and pedagogical principles into their design and structure. To stimulate reflection, it is not sufficient to simply get participants to discuss choices of actions to the scenarios' challenges. The course should create conditions that enable participants to make inquiries about the assumptions and understandings that form their decisions and response actions. To support this, focused attention needs to be placed on instructors' competencies. The fire and rescue services have not established any specific requirements to ensure pedagogical competence amongst instructors. The current practice for selecting instructors is based on practical experience and personal interest related to the subject area to be taught. Our work indicates the need to develop pedagogical competence and equip instructors with methods and tools that promote problem-solving, critical reflective thinking and creativity.

Considering that each tunnel has its own characteristics, and fire and rescue services differ in terms of organization, resources and practices, how the learning content is structured and organized should be rooted in the needs of the local fire department. Thus, we recognize the limits of the course's generalisability across other countries. Most of the theoretical lectures, including "The seven-stage model", are more or less applicable to other contexts. However, the practical exercises were situated in the local context of the fire department where the pilot course was conducted. To account for potential applicability to other countries, the practical exercises should emphasize the situational needs of the fire department and the specific characteristics of the tunnels in the fire department's geographical area. Situational needs should also influence the development of learning goals with subsequent considerations, thus making the implementation of a standardized curriculum nearly impossible.

Conclusion

In this study, we examined how principles of design science and elements of Sommer et al.'s (2013) model of learning in emergency response work may be combined to develop an artefact that facilitates learning and enhances incident commanders' competence in tunnel

fire safety. The findings described above point to ways that the fire and rescue services can refine their existing approach to learning and integrate a new one to enhance workplace learning and achieve positive outcomes for the personnel in terms of improved work-life capacities.

As expected, in line with Sommer et al.'s (2013) model of learning, much learning seems to arise through participants' engagement in the learning activities. This engagement in goal-directed activities stimulates the process of ongoing development, and participants are exposed to new experiences and challenges from which new learning arises. However, the quality of learning is supported by the specific information (i.e., content of learning) provided by the artefact, the context where learning takes place, the instructional techniques and interactions with more experienced others (i.e., colleagues and instructors). The design of the course has assisted these interactions through the assignment of specific roles during the practical exercises, solving specific problems, and guided instruction. We claim that these kinds of interactions provide knowledge and experiences that might otherwise be limited by participants' discovery alone. As instructing can be quite demanding and to help embed significant mechanisms and foundational principles for learning in learning activities, greater consideration needs to be directed towards preparing the instructors for their roles.

To enhance the actual level of knowledge within the fire department and to meet the needs of incident commanders, the course placed a large emphasis on specific emergency response knowledge in local tunnel contexts. This knowledge was previously revealed to be scarce (Bjørnsen et al., 2023). Incident commanders' capability to successfully cope with tunnel fire responses is neither acquired fully in the classroom nor learned entirely through experiences in the field. Tabletop exercises in combination with theoretical lectures and physical role-play exercises seem to be useful means for the vocational learning of incident commanders, as they bridge the gap between classroom instruction in the abstract and practical training, by allowing participants to apply their knowledge and experiences to carefully chosen scenarios. Importantly to note is that these exercises are effective only when they are accompanied by techniques that stimulate critical reflection and by skilled instructors. Thus, the practical exercises were designed to encourage the participants to exchange experiences and critically reflect upon how their decisions and choices of action may affect the outcome

of the response operation. The use of critical reflection and creativity to solve realistic problems in local tunnel contexts seems to be a new approach for fire and rescue services.

The model of learning in emergency response work has assisted the development of the course and was originally developed by several researchers who gathered information from a wide range of sources which contributes positively to the trustworthiness of the findings. However, the practical contribution of the course was tested in the context of one specific fire department which is acknowledged as well-informed and highly competent in tunnel fire safety. Future studies might benefit from testing the course in a broader context and further investigate how the learning-supporting experiences revealed in this study relate to other fire and rescue services to improve performances in tunnel fire responses.

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Specialists' views on feedback at the medical workplace

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The present study aimed to explore the role of feedback in the medical workplace in the domain of radiology. Feedback is considered essential for learning, performance, and professional development, as it helps to build knowledge and skills, to correct errors, and to provide safe and autonomous patient care. Fifteen specialists were interviewed about what role feedback played in their own professional development. Moreover, we enquired about how they interact with residents and how they provide feedback in their daily work. Content analysis was used to categorise participants' answers. Results show that specialists see feedback as an omnipresent phenomenon at the workplace and perceive it as central to training. Feedback is usually provided face-to-face to reinforce and transfer knowledge, improve domain-specific knowledge, reduce mistakes, improve the outcome for the patient, change behaviour patterns, or increase social skills. Although feedback at the workplace was considered important for professional development, physicians stressed that there is often not enough time to discuss performance and possibilities for performance improvements.

Forming tandems between less and more experienced physicians, so that learning becomes more embedded in medical practice and work activities might be a facilitating condition at the workplace.

***Keywords**: feedback, medical workplace, qualitative research, learning and professional development*

Introduction

For junior physicians, residency is the first professional experience in the clinical workplace. They are on a journey towards authenticity to become independent specialists. This phase is considered one of the first and most important milestones on the path to professionalism. It is during this time that residents encounter the first challenges in everyday clinical work, practical experiences are gained and professional responsibility is assumed for the first time (Leach, 2009). The medical domain is hierarchically structured. In the medical workplace, experienced senior physicians (specialists) have to cooperate with less experienced novice physicians (residents). The workplace offers good learning opportunities if social interactions during work activities are understood as a potential source for learning (Van de Wiel et al., 2011). Especially for residents, social interactions and feedback are indispensable. Renting et al. (2016) showed that the feedback from experienced physicians influenced residents' professional knowledge and their acting at work. The present study aimed to explore the role of feedback in the medical workplace in the domain of radiology from the viewpoints of specialists.

The power of feedback at the workplace

People in working life learn in and through the context of their daily work (Simons & Ruijters, 2004). What and how people learn depends not only on the motivation and effort they invest into their development but also on the social support and interactions within the professional community (Ericsson et al., 2007; Hakkarainen et al., 2004; Lave & Wenger, 1991). The challenge at work compared to formal learning settings (e.g., at school or university) is that learning is not the main focus but rather accomplishing the required work tasks often even under time pressure. Through formal training, people have already

acquired large amounts of knowledge, which is then further developed, elaborated, and adapted by professional experience. Delving into work practices shapes and continuously reorganises cognitive structures and processes. Individuals become more and more familiar with problem-solving procedures and routines in their professional field (Boshuizen et al., 2020). Deliberate practice, integration into professional networks, and support of experienced peers who provide feedback facilitate and foster learning and professional development at work (Govaerts, 2013; Gruber et al., 2008).

As the period of residency is perceived as demanding, social support such as collegial relations and medical leadership can help reduce stress. Additionally, experienced colleagues can act as role models for professional identity formation (Mikkola et al., 2018). Social support in the form of feedback can be seen as a catalyst for learning. Van de Ridder et al. (2008) define feedback in the clinical context as "specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance" (p. 193), which is similar to the feedback definition by Hattie and Timperley (2007) "information provided by an agent [...] regarding aspects of one's performance or understanding" (p. 81). According to Hattie and Timperley, effective feedback should answer three questions, namely "Where am I going?", "How am I going?", and "Where to next?". These questions address feed-up, feed-back, and feed-forward, respectively. Research indicates that feedback about the processing of the task and self-regulation is most effective for deep processing and mastery of tasks, while praise is unlikely to be effective (Hattie & Timperley, 2007; Kluger & DeNisi, 1998). However, providing feedback and receiving feedback is a complex interplay of many facets that need consideration. In a recent study, Mandouit and Hattie (2023) revisited the model of feedback (Hattie & Timperley, 2007) taking the perspective of learners into account. Interestingly, self-level feedback such as praise turned out to be more positive, especially regarding positive emotions, motivation, and confidence. Although feedback usually has a positive connotation, research has also revealed that feedback can have positive and negative effects depending on the working environment, atmosphere, and colleagues at the workplace (Mikkola et al., 2018; Van der Rijt et al., 2012). Residents value formative and continuous feedback (Chru-Hansen & McLean, 2006) and

it should aim at influencing knowledge, skill development, and acting positively (Gorniak et al., 2013; Govaerts et al., 2013; Renting et al., 2016). A large survey study in an academic medical centre (Pascarella et al., 2023) investigated preferred feedback styles and revealed that most participants value direct feedback after an activity away from their team. The initiative for feedback can come from different directions either top-down (e.g. from a feedback provider such as a supervisor) or bottom-up (e.g. from a feedback seeker such as a resident). Proactively seeking feedback was found to be related to professional development (Cheramie, 2013; Van der Rijt et al., 2012).

The present study

Since prior research in the medical domain has focused primarily on feedback recipients (Ibrahim et al., 2014; Parker et al., 2017; Sagasser et al., 2012; Teunissen et al., 2007; Tham et al., 2017; Van der Rijt et al., 2012), it seems beneficial to take a closer look at the perspectives of feedback providers. This additional viewpoint allows a more holistic understanding of feedback as a tool for supporting professional development. Radiologists can be understood as important service providers in the clinic since imaging techniques in radiology are crucial for diagnostics, which are often the prerequisite for further treatment of patients in various medical departments. With this central position in the clinic, senior radiologists play an important role in the training of residents, offering social support and giving feedback. To our knowledge, no empirical study in the domain of radiology has explored the perspectives of feedback providers. In this study, the following research question was addressed: How do specialists interact with residents and provide feedback during their daily work?

Method

Participants

A total of 24 radiology specialists were asked whether they would like to participate in this study. Fifteen radiologists (4 females and 11 males) from four hospitals agreed to be interviewed. This corresponds to a response rate of 62 per cent. All physicians who had at least one fully completed specialist training were considered radiology specialists.

In total, the participants consisted of three specialists, eleven senior physicians, and one chief physician. The mean age was 38.87 years (SD = 6.38 years), and the average work experience was 11.80 years (SD = 5.81 years). They estimated to have an average of 53.38 working hours per week (SD = 11.06 hours) and indicated that the team consisted of approximately 11 residents (M = 11.33, SD = 6.44 residents). The participating radiologists will be referred to using the abbreviations R1–R15.

Procedure

A qualitative case study methodology was used, in which radiologists were treated as a set of individual cases to explore their experiences and perceptions about feedback at work in detail (Robson, 2002). In line with Miles and Huberman (1994), a case was understood as "a phenomenon of some sort occurring in a bounded context" (p. 25). The epistemology that guided this qualitative case study was constructivism (Yazan, 2015). As a method to elicit depth and richness of participants' experiences a semi-structured interview consisting of five parts was developed. First, general information such as age, work experience, and working hours was collected. Second, questions about the role of feedback during their residency and their professional development were asked to find out whether and how experiences shaped them (e.g., "What was important for you as a resident for your professional development?"). Third, it was enquired how the participants interact with residents in their daily practice (e.g., "What is the importance of professional exchange with residents for you?"). Fourth, in the main part of the interview, the focus was on the role of feedback and how the participants provide feedback at the workplace (e.g., "With what aim do you give feedback?"). Fifth, recommendations for medical practice and professional development were provided (e.g., "How do you think the feedback process can be improved?"). During the interview, all participants were asked to illustrate their answers with examples to provide detailed information.

Participation was voluntary and all participants gave their written consent in advance of the interview. The APA Ethical Principles of Psychologists and Code of Conduct were followed. In case of an agreement to participate, a personal appointment was made. The interviews were recorded and then transcribed verbatim. An interview

lasted an average of 37.78 minutes (SD = 12.58 minutes).

Analysis

The analysis aimed to derive findings from the interview data to describe and interpret medical feedback and social interactions in the radiology workplace. Content analysis was used to categorise participants' answers. A combination of deductive and inductive content analysis was used to achieve the best possible category formulation and data explication. Analysis proceeded in an iterative process. The deductive content analysis started with the main themes and activities addressed by the questions (own professional development, interactions with residents, role of feedback at work, and recommendations for medical practice). Answers were grouped based on these themes and further categorised into subthemes that emerged from the data (e.g., feedback during own residency, ambition or goal-directed activities). Based on the classification of the data into subcategories, codes were generated (e.g., subcategory feedback during own residency, codes: form, person, way of learning, benefits, help, best feedback, worst feedback). The coding was theory-driven. The data in each subcategory was summarised, and similarities and differences in statements were identified.

Findings

Own professional development

All participants saw their residency as a good opportunity to develop professionally and they talked about various goal-directed activities. Four radiologists mentioned taking their initiative early on (e.g., reading specialist literature and working on interesting cases) and advanced training during their residency was perceived as essential. For three interviewees, it was particularly important to encounter the radiological spectrum of services as comprehensively as possible, to see rare diseases and to participate in as many examinations as possible. Three other participants looked for versatile colleagues and medical role models in their environment to learn as much as possible from them.

> *What got me the most was when someone was enthusiastic about what s/he was doing. That, yes, a passion. If that coincided with my interests, then it motivated me strongly. (R12)*

For three interviewees, it was particularly important to have ample opportunities for research and scientific work as well as the possibility for further training outside the clinic during their residency. Independent diagnostic work as well as taking on responsibility were stressed by three radiologists as relevant for their professional development. Two participants indicated the communication with colleagues and practical medical activities, as well as the opportunity to apply knowledge and reflect on their performance afterwards.

Feedback during their residency was perceived differently by the radiologists. Nine participants received verbal feedback at the workplace relatively quickly and directly during or after the diagnostic reasoning and reporting process. Five participants explained that they had to describe their diagnostic findings to a senior physician, who then either agreed with their proposed diagnosis or corrected the resident by stating a different finding. For four interviewees, these feedback situations took place daily. Most of the participants rated this form of feedback as constructive.

> *I think that feedback improved my diagnostic quality as I received additional information. […] I also gained much through looking up information, reading, and asking. (R6)*

> *He showed me how to do it right. Copying him was the learning effect. (R9)*

> *Logically it helps if you have the appraisal of someone who knows a lot. That gives you certainty, I think. (R12)*

Seven participants indicated having received negative feedback in the form of a critique when an action in the workplace needed improvement, while seven other participants mentioned having received little to no feedback during their residency. Occasionally, six radiology specialists experienced positive feedback in the form of praise when something went well. However, most participants said that no feedback could be considered positive feedback.

> *You often only get to know what is going badly or not going well and usually not what you could improve and how. (R 14)*

> *Well, I was either criticised or nothing was said. Very rarely I got*

praise. (R11)

If something went well, you never really got any feedback. (R15)

Overall, feedback during the residency was seen as good preparation for later independent specialist work. Twelve participants found feedback helpful, especially about improving radiological differential diagnostic skills and the quality of radiological reporting. For three radiologists, feedback from experienced colleagues was helpful for further motivation and confidence in radiological work. Feedback in general played an elementary role in medical training for two interviewees. Three participants saw a positive effect on social aspects in the workplace through the provision of feedback (e.g., communication with other colleagues or the realisation of cooperative successes). One interviewee perceived the feedback providers as role models for his later interaction with residents. Only one person thought that there was no helpful feedback during his residency.

In their current role, the radiologists mentioned the following goal-directed activities to develop themselves professionally and to stay up to date: reading, practising (related to angiography), interdisciplinary exchange, interacting with colleagues, and advanced training. Only one participant faced a lack of time to pursue goal-directed activities to further support his professional development.

I exchange with my colleagues; we are very open. We talk very straight and directly about many things. That is most important for my professional development. (R11)

At present, interdisciplinary exchange, international conferences, and further training are important. (R14)

Interactions with residents

All respondents indicated that professional exchange and the training of residents is one of the central tasks of a clinic. The radiology specialists see their responsibility in the professional supervision of residents (e.g., support to prevent insecurity, guidance, or instruction during medical examinations, being a contact person in the background) and quality assurance at the workplace. Residents were perceived as members

of the team fulfilling an essential role. For fourteen participants the professional exchange with residents mainly occurs in those situations that require a diagnostic report, and these interactions were experienced as beneficial because specialists also gain new information themselves. For four interviewees, the exchange also takes place during morning meetings, interventions, and examinations. Three interviewees also spoke of direct interactions with residents during radiological demonstrations as well as educational courses, in which fundamental knowledge is taught or reviewed (especially at the beginning of residency).

> *The guidance of the medical examination: How does it work? Which technique to use in a particular case? Then the resident will gradually carry out this examination independently. (R1)*

> *I must be readily available for the residents in case they have questions, or I check whether the diagnostic findings are correct. (R9)*

> *Naturally, I also always learn something new. Sometimes, residents know something, I did not know. (R4)*

Role of feedback

For all participants, feedback at work played a very important role as it contributes to learning and further development. They understood feedback as a kind of response or acknowledgement related to accomplishments, actions, or work performances. For two participants feedback was also seen as a means of assessment or confirmation.

> *Feedback is the central element of the training. (P4)*

> *[Feedback is] Any kind of response related to diagnostic findings and treatment of patients. (R15)*

> *Feedback to me is providing information for my counterpart related to an action or a performance. Essentially, also something I assess. (R10)*

Positive feedback as mentioned by eight interviewees was related to praise with an emphasis on a well-done performance or action associated with positive terms like "good" or "wonderful". For

five participants, positive feedback was seen as reinforcement or confirmation.

> *Positive feedback would be when I say: wonderful. Nothing more to add, nothing more to improve. (R3)*

> *Positive feedback for me is, in some form a reinforcement. That it is important what has been done as well as desirable from my point of view and that it should be continued in this form. (R11)*

Ten radiologists described negative feedback as a form of criticism stressing a poor performance, which is ideally connected with corrective feedback that points out mistakes, provides suggestions for improvement, and clarifies expectations.

> *For me, negative feedback means that I emphasise something he did badly. Negative feedback in terms of gradations, what he has done badly. That means drawing attention to a mistake such as "Here you have overlooked something". And that's 95 per cent of the feedback. (R10)*

> *Comments like: "Why did you do this examination? That was total nonsense! You should not have done it!" without elaborating any further. Negative feedback is, in that sense, negative information. However, it must be presented understandably, because, of course, you grow from it. (R6)*

Interviewees distinguished between feedback that happens daily in small conversations along the way (e.g., diagnostic reporting) and feedback in the context of employee appraisals, which are planned meetings (e.g., once, or twice a month, once a year) that focus on the individual work performance and progress. Three radiologists mentioned giving face-to-face feedback directly in a friendly manner and suggesting points for improvement. Nine interviewees stated to give feedback verbally, and occasionally also in written form. They preferred a constructive approach with a combination of positive and negative feedback. Moreover, they indicated trying to understand why residents acted in a certain way. Some of them admitted that they find it sometimes difficult to mention positive aspects during their feedback. Two interviewees said that they decide spontaneously what kind of feedback is most suitable depending on the situation.

> *I try to teach them things. This can be done through positive or*

> *negative feedback. I think you have to develop a sense of whether positive or negative feedback is best for the candidate. (R4)*

All interviewees stressed that the aim of providing feedback should be to support the residents in their radiological work and to foster their professional development. Seven interviewees considered positive reinforcement, improvement, and transfer of domain-specific knowledge as crucial. For five participants, the goal of their feedback was to avoid mistakes in the future. Another five radiologists focussed on improving the residents' professional knowledge and increasing their social skills so that they become good physicians and colleagues. Three respondents wanted to convey that the quality of the work must be optimal to improve the outcome for the patients and to represent the respective institute. Two interviewees attached importance to either confirming residents in their actions or changing their behaviour.

To achieve these aims, radiologists mentioned tailoring their feedback to residents' work experience as well as to their personalities. Eight interviewees thought that it is important to take the years of residency into account when giving feedback. These interviewees were convinced that inexperienced colleagues (e.g., residents in their first year) should receive more feedback. Three other radiologists thought that previous clinical experience was a decisive criterion for the type of feedback. Instead of work experience, four participants thought more about residents' personalities when giving feedback. In their opinion, the acceptance of and reaction to feedback was more related to individual factors. Seven radiologists had the impression that residents deal differently with negative and positive feedback, but predominantly they rated the handling of feedback as positive. The participants also experienced gratitude and joy from the residents about the feedback given.

> *I differentiate the profoundness of my feedback based on the educational attainment of the residents. […] Another aspect that is very important when providing feedback is the personality of the residents. (R15)*

> *Yes, some residents float in the clouds when they receive positive feedback and think they are the greatest. But there are also residents, who want to throw themselves off the next bridge*

> *when they get negative feedback. […] That is very, very different from person to person. You see completely different reactions to the same kind of feedback. Yes, I think it depends on the personality of the individual doctor. (R10)*

For seven participants it was important to tell the feedback recipients that their feedback is not about personal, but rather professional matters, about the content of the feedback message to be conveyed. Three radiologists emphasised that one should be polite when giving feedback, being nice and friendly despite the other person's mistakes and showing appreciation.

> *I always try to be nice and friendly. Even if there are mistakes, I try not to annoy them or show them up in any way - or say: "How stupid can you be?" - but to remain polite. That is important to me. (R2)*

Seven participants said to prepare themselves for feedback conversations, but rather briefly and mentally, especially in cases of planned appraisal interviews, exceptional situations, or written feedback. During preparation, they indicated to focus on the goals and the order of topics to be discussed in their feedback. Eight interviewees mentioned that they do not prepare themselves for giving feedback, because it usually happens spontaneously during daily discussions about diagnostic findings. Giving feedback was also associated with providing all kinds of hints to foster residents' learning and professional development. For instance, seven radiologists mentioned that they inform residents about specific textbooks or scientific articles, while three participants said to advise about further training events and relevant medical contacts. Two participants indicated making their materials from congresses or further education available. However, three interviewees explicitly stated that they expect residents to be proactive and show initiative in self-study to progress professionally. Twelve participants thought that residents ask actively for feedback, especially to clarify uncertainties and questions regarding diagnostic processing, procedures, findings, and reporting. According to them, residents seek confirmation. Surprisingly, the participants stated that they were not asked to provide feedback.

> *I try to focus on where I want to go with the resident. What we*

> *want to achieve together. What we want to learn and need to improve further. (R11)*

> *There must be a will to read further independently. We are no longer in school, where I would say "Now read this book, otherwise…". We are in working life. (R7)*

To monitor whether the provided feedback is also implemented, the participants indicated different strategies. Two radiologists mentioned that they ask residents questions afterwards. For eleven participants, the verification is carried out by observing the errors of the residents directly during the preparation, review, and approval of the findings. While five participants said to check systematically, the other ten mentioned doing that occasionally.

Eight interviewees expressed the feeling that giving feedback is usually positive. Five participants explicitly stated that they enjoyed providing feedback, but finding enough time was perceived as challenging. For four interviewees giving feedback was seen as a professional part of their daily work without any particular feeling involved. In contrast, three interviewees experienced providing feedback as rather demanding and initially even found it unpleasant, especially when it concerned more social, personal feedback.

> *It is difficult. For instance, if I have to correct my specialist colleagues. If I see something, specialists have not noticed. Then I need to inform them like "Listen, you have overlooked something here". I always find that difficult. (R2)*

> *It was much harder for me at the beginning than it is now. Of course, I was not used to getting positive feedback during my training. You have to rethink and say: Yes, but it is a good thing, and it is important. (R8)*

Seven participants stated that they have attended training, in which the topic of feedback was addressed at least to some extent. Five of them evaluated this training as helpful, while two persons could not take away much knowledge for their daily work. The eight radiologists who had not yet attended a course about feedback thought it could be useful, especially in difficult situations (e.g., correcting a superior).

> *I often do not know what the right way is if someone did something wrong. Then, I cobble something together, in a way I think is somehow humane. Professional instruction on how to best do that would be valuable. (R13)*

Recommendations for medical practice

Seven interviewees would welcome more structure in the provision of feedback and stressed the importance of standardisation so that feedback discussions can take place regularly. Also scheduling more time for feedback was explicitly mentioned. In addition, the provided feedback should be noted down in brief so that one can easily refer to it at a later point in time. Two radiology specialists suggested a process optimisation in reporting and feedback, by which direct feedback can be given immediately to the residents with each electronic report, thus after the diagnostic process.

> *You could really improve the feedback practice if you implement it in our routines, really standardising it. For instance, if a new resident starts you inform her/him that there will be a feedback moment after, let's say, two months with a particular specialist. (R11)*

> *At the end of the day, the way things are going now is not very systematic. There are six senior physicians, and they all want something different, they all attach importance to something else, which is overwhelming for residents. [...] What would make sense is to define standards together somehow, so that the residents know, okay, this is good, this is bad, this is what is desired. (R13)*

All participants agreed that professional exchange with residents in the radiology workplace is important. To be well prepared for this task, five participants recommended that colleagues educate themselves, stay up-to-date, and perceive the exchange as a good learning opportunity for themselves. Two participants mentioned that senior physicians should act professionally, maintain their neutrality without judging another person, consider the level of training, and be more open about sharing their knowledge with colleagues. This is in line with eight participants, who emphasised the benefit of compulsory training about feedback for

all senior physicians as it would increase the quality of feedback. Finding a balance between positive and negative feedback (with a tendency to be more positive), as well as conveying security on the one hand and allowing independence on the other hand was perceived as important but also as challenging. One interviewee stressed the need to balance digital and face-to-face exchanges and to sit down with residents - especially in the beginning - to observe them and explain as much as possible.

> *I think giving feedback is important. I think you should do it at the level where it comes across. For me, it is the level of "collegial". […] You should give both positive and negative feedback. (R6)*

> *I think that you often ask yourself the question of how to provide negative feedback. There is, I think, a great discrepancy between colleagues. (R7)*

For professional development, ten participants advised residents to be curious, to do research, to read a lot, to actively ask questions and ask for feedback, to be diligent, to stay attentive at work and to take in as much information as possible. Four interviewees recommended taking a broad professional approach and following one's interests and gut feelings. Furthermore, four participants pointed out that it is important to choose good medical colleagues with whom one enjoys working together and to orient oneself towards these good medical colleagues to learn as much as possible.

Discussion

In this qualitative case study, semi-structured interviews were used to explore the views and perspectives of radiologists about feedback to gain a deeper understanding of how specialists interact with residents and provide feedback during their daily work. The interview covered radiologists' experiences during their residency as well as their current work practices with residents.

The look into their past and their professional development revealed quite some differences. While some reported positive experiences with highly engaged feedback providers, others were rather critical about the feedback they had received. They had the impression that feedback was

formulated rather negatively and vague without specific suggestions for improvement to support learning. Taking initiative and independence were therefore perceived as all the more important for one's professional development. From a learning perspective, this viewpoint can be questioned, because it might intervene with working closely together with experienced colleagues, who could foster deliberate practice and critical reflection (i.e., Cordero et al., 2013). Moreover, social support has been found to reduce stress and influence professional identity (Mikkola et al., 2018). Additionally, proactive behaviour like actively seeking feedback has been identified as an essential tool for professional development (Cheramie, 2013; Van der Rijt et al., 2012).

When reflecting on their current work practices with residents, the participating radiologists expressed that feedback was an omnipresent phenomenon at the workplace and they experienced it as a central element of training and professional development. This is in line with the results of the study conducted by Gorniak et al. (2013), where feedback from experienced colleagues in the medical workplace is understood as an important factor for the development of radiological reporting skills. Furthermore, research shows that social interactions at the workplace can enhance learning and interprofessional interactions are significant for the further professional development of all persons involved (Goldman et al., 2015; Mikkola et al., 2018; van de Wiel et al., 2011). It is evident from our participants' answers that social interactions with residents are an inherent part of their everyday professional work. The interviewees valued such interactions as beneficial and instructive, also because they can occasionally gain new information themselves and expand their knowledge. Moreover, the radiologists mentioned that professionalism is important during social interactions meaning that conversation partners should prevent expressing personal opinions or judgements.

Despite the appointed importance of feedback, only half of them had followed formal training about providing feedback or a related topic. Thus, their own experiences were the basis for their way of acting. Feedback was usually provided face-to-face and for most participants, feedback takes the form of small daily comments on the radiological reporting activity. This finding corresponds to the direct feedback preferences that were revealed in the study by Pascarella et al. (2023). The radiologists generally equated positive feedback with praise, but

according to them, this did not happen often enough. Research in the academic context has indicated that praise or self-level feedback was least effective for learning in comparison to feedback on task, process or self-regulation level as the information is often too vague (Hattie & Timperley, 2007; Kluger & DeNisi, 1998). However, the findings of a recent study (Mandouit & Hattie, 2023), in which the perspective of feedback receivers was considered, suggest that self-level feedback can stimulate positive emotions, motivate learners, and increase confidence and self-efficacy. Future research would have to investigate whether similar results could be replicated in workplace settings. Depending on the way feedback is provided, it can have positive and negative effects (e.g., Mikkola et al., 2018; Van der Rijt et al., 2012) and therefore careful handling is advised.

Interestingly, no feedback was also understood as positive feedback by our participants. However, this can be misleading, especially for novice radiologists, because not receiving feedback could cause uncertainty or misinterpretation of one's performance affecting self-confidence. Our interviewees indicated that they needed to develop a keen sense of what works for whom. While some radiologists enjoyed providing feedback, others found it rather challenging. Especially, in cases, in which hierarchies were involved or more personal feedback was required. Choosing the right balance between positive and negative feedback was perceived as desirable but also sometimes difficult. They tried to focus on the factual level (e.g., comments related to the diagnostic activity). Feedback was mostly given on the task level, occasionally on the process level, to improve performance and prevent errors (i.e., Govaerts et al., 2013). Providing feedback was done to reinforce, transfer knowledge, improve domain-specific knowledge, reduce mistakes, and improve the outcome for the patient, change behaviour patterns or increase social skills. Considering the three feedback questions in the model of feedback (Hattie & Timperley, 2007) related to feed-up ("Where am I going?"), feed-back ("How am I going?"), and feed-forward ("Where to next?"), our findings suggest that radiologists mainly focus on feed-back and feed-up, while feed-forward was not mentioned. There might be different explanations. One reason could be the time pressure at work that was mentioned frequently. Another reason could be a lack of knowledge about effective feedback. As suggested by our participants, more standardisation, and a common understanding about what good

and not good feedback is, could be means to improve feedback practices at work.

Limitations, future research and practical implications

Although our study reveals valuable insights into radiologists' views and perspectives on feedback, this qualitative approach comes with several limitations. First, the sample was rather small, so the diversity of radiology specialists and hospital variety cannot be fully captured. In addition, participation was voluntary, which might have led to selection bias. When preparing the study, we had the opportunity to do some work shadowing and observations to gain a better understanding of the work practices. The collected interview data corresponded to what we experienced. However, caution is advised, because the data presented in this study is based on self-reports that were not verified by other measures and participants might have been subject to give socially desirable answers. In future research, it would be valuable to combine the self-image with external perceptions, for instance, by also collecting the viewpoints of residents accompanied by observations at work. Such an approach would yield a more holistic image of the feedback practices at the medical workplace. It would also allow us to investigate how feedback can be most effective to help improve learning and professional development at time pressure sensible and labour-intensive workplaces.

The findings of our study suggest that having guidelines for the diagnostic process that are used as a kind of checklist could be a helpful tool to facilitate interactions with residents. Moreover, defining genuine rules and standards for feedback at the workplace, creating room for discussion and exchange, and communicating what is expected of the different parties involved (e.g., residents being proactive) might support more uniform and transparent acting. Forming tandems between less and more experienced physicians, so that learning becomes more embedded in medical practice and work activities could be another facilitating condition at the workplace.

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The experiences of doctoral students working in university settings

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Informal learning activities and workplace learning constitute a substantial part of a PhD student's knowledge as an adult. It is essential to define the concept of workplace learning and the roles and responsibilities of doctoral students clearly and transparently while explaining how doctoral courses and workplace experience correspond to each other. Learning, in this sense, manifests itself in everyday practices of work and social contexts. In this vein, this study explores the informal workplace learning experiences of PhD students working in university settings with different job titles to offer new contributions to the literature on informal adult learning. Data were collected through in-depth semi-structured interviews with 10 PhD students who were employed in different university settings. Thematic analysis was used to interpret the data. The findings revealed that doctoral students working at universities learn at work by participating in various

work-related tasks, collaborating with their colleagues and other people in these settings, and encountering new challenges that provide learning opportunities for them. The unexpected challenges, tasks, and office conversations that are not directly related to the work play key roles in the learning and skill acquisition of this target group. Doctoral students are among the intellectual assets of their home countries and the world. In addition to their formal graduate education, understanding their informal learning and how they learn in their workplaces will be of value for both academia and organisational effectiveness. In parallel to this, the idea of educating the qualified labour force of the future through graduate education has become a fundamental issue for every country in efforts to compete on a global scale.

Investigating this phenomenon in different university contexts and area-specific programs would contribute to a better understanding of the informal workplace learning experiences of doctoral students. Graduate program planners could consider integrating the informal learning processes of graduate students into future graduate programs.

***Keywords**: informal learning, workplace learning, informal workplace learning, graduate education, doctoral students, connectivism*

Introduction

The demand for more human capital has increased, especially in recent years, with the demand for more production in knowledge societies. The knowledge-based economy on a global scale has increased the learning needs of individuals to meet such demands (Kessels & Kwakman, 2007). Under these conditions, doctoral studies have gained significance. Knowledgeable individuals are seen as potential contributors to economic development (Claxton, 2004). In this worldwide context, formal education in graduate schools for PhD students is not sufficient for global competition in the labour market. That is one of the reasons why the informal and workplace learning activities of these individuals have increased rapidly in recent years (Tynjälä, 2008). Informal learning takes place spontaneously, is unstructured, and happens in

daily life in a variety of settings without a curriculum as defined in the literature on workplace learning (Hann & Caputo, 2012; Le Clus, 2011; Merriam et al., 2007, Misko, 2008; Sambrook, 2005). According to this point of view, learning primarily arises through socialisation without awareness (Livingstone, 2001). Everyday informal learning can occur in three ways: through self-directed learning, incidental learning, or socialisation/tacit learning (Schugurensky, 2000). All three kinds of everyday informal learning may or may not be conscious or planned. Workplace learning has two main directions. First, there may be a focus on the articulation between education and work to recognise and provide credentials for all forms of individualistic learning, reflecting cognitive theories of learning. Second, workplaces where learning takes place naturally can be considered as good learning atmospheres since any learning occurring is based on the rules of the organisation. Therefore, the learning occurring in such a workplace can be described as situated learning (Cullen et al., 2002) Indeed, workplace learning may focus on individual or social learning (Illeris, 2003). Understanding the informal workplace learning experiences of PhD students is valuable in exploring their individual and social learning in this sense.

Literature review

Informal learning

The idea of lifelong learning has emerged rapidly in recent years with the increasing effects of the knowledge economy in the globalised labour market (Glowacki-Dudka & Helvie-Mason, 2004; Kessels & Kwakman, 2007). In this knowledge-based globalised market, individuals are forced to build and improve their knowledge and skills unceasingly (Lester & Costley, 2010; Livingstone, 1999). It is important to highlight that the idea of lifelong learning is not limited to only the labour market; it is also related to personal and social fulfilment (Sheridan, 2007). In today's world, vast amounts of information and learning tools are accessible to learners for reaching such information thanks to the ongoing changes in technology. Even within traditional schooling systems, reforms are being undertaken to improve learning so that individuals will be better prepared for the future workforce and lifelong success.

As individuals are always forced to learn new things and improve their

existing knowledge in today's knowledge-based world, they need lifelong learning opportunities. These opportunities may be available to them in both formal and informal ways.

However, the role of informal learning as a part of lifelong learning ideology is increasing day by day (Glowacki-Dudka & Helvie-Mason, 2004; Kessels & Kwakman, 2007). Everyday informal learning particularly emerges from the context of the work or life experiences of individuals. Informal learning that takes place in the course of daily activities and interactions has certain characteristics. First of all, there is no formal guidance. Instead, the individuals themselves or the workplace context guides the learning processes. Secondly, there is no organised curriculum or instruction. Ongoing experiences and practices function as the curriculum and instruction. Research on adult learning has confirmed that informal and workplace learning foster the informal learning processes that occur in people's daily lives. In addition, it is emphasised that informal learning is a social process that occurs without one realising it (Livingstone, 2001). From the perspective of the workplace learning literature, informal learning takes place spontaneously in daily activities and interactions (Hann & Caputo, 2012; Le Clus, 2011; Misko, 2008; Sambrook, 2005). It is highly integrated into the daily lives of individuals and occurs socially based on learning needs without awareness. Based on individuals' levels of awareness and the underlying motivations of their learning needs, informal learning is divided into three subcategories by Schugurensky (2000): self-directed learning, incidental learning, and socialisation/tacit learning. The awareness of learning needs and changes in behaviour are the two main requirements of self-directed learning. In the case of incidental learning, individuals are not aware of their learning needs; however, they are somehow aware that learning occurs. Finally, in the case of socialisation, individuals are not aware of their learning needs or of the occurrence of any learning.

Workplace learning

Learning is seen as a permanent change of capacity in the minds and skills of individuals (Illeris, 2003). Individuals should be taught how to be lifelong learners in knowledge societies to produce the necessary human capital, which is highly essential for economic development (Claxton, 2002; Claxton, 2004). According to Claxton (2006), learning

has three main aims. These are improving standards via better study approaches, fostering better learning atmospheres, and contributing to the lives of individuals by making them better learners. The last of these three aims prepares young people for a lifetime of change, which is necessary in the 21st century. Individuals are expected to track their learning and development, while teachers are expected to teach content that will increase the learning capabilities and improve the learning dispositions of the learners. Claxton further underlines that recognising the importance of dispositions has come to prominence as a fourth stage of development in educational processes. When it comes to workplace learning, there are two main approaches. Recognising any kind of learning experience on an individual level and providing educational credentials for them is essential based on cognitive theories of learning. Alternatively, learning can be seen as an indispensable part of participation in workplace practices based on contextual theories of situated learning (Cullen et al., 2002). Hence, workplace learning can be discussed in terms of the experiences of individuals or the social setting (Illeris, 2003).

Combining these two approaches by extending the theories concerning adult learning, action learning, and learning organisations is a logical next step (Mitchell, Henry, & Young, 2001). At this point, it is important to highlight the following shifts:

> *"From processes focusing on individual and personal development as a worker to instrumental focus where learning at individual, group, and organisational level is related to a goal of enterprise competitiveness."*
>
> *"From learning as the responsibility of individuals and human resource developers to incorporation in wider strategies for human resource management and a more inclusive view of learning as embedded in all layers of business strategy, culture, and structures; learning as continuous improvement."*
>
> *"From learning as declarative knowledge to an emphasis on practical knowledge or know-how and on tacit or implicit knowledge that is not possible in the sense of being communicated to others."*
>
> *"From learning outcomes as competencies and skills that are*

> *observable and transferable from one context to another to learning processes whose outcomes are more intangible and expressed as images, metaphors, conceptual maps, shared understandings or disposition such as commitment and loyalty." (Cullen et al., 2002, p. 34).*

The shifting features listed above reflect the differences between workplace learning and education. There is a focus on the impact of learning organisations on learned knowledge, learners, teachers, learning environments, and learning processes. In these organisations, information is distributed not individually but through learning networks. For this reason, establishing the necessary networks is the most important criterion for learning in this sense. Learning through networks supports local and solution-oriented learning, and it gives learners the chance to be free within the framework of the values of the organisation. However, it may not always be preferred due to the hierarchies that may exist within organisations (Cullen et al., 2002).

Informal workplace learning

Training offered in a formal classroom style in or out of a workplace can be a complement to on-the-job experience, especially for new employees. It is also valuable for more experienced workers (Misko, 2008). Although one would expect to see some of the features of informal learning arising in everyday life within the work setting, it is important to make the distinction between learning at work and learning in work (Sambrook, 2005). Learning at work is a more formal process. Informational courses provided outside of the employee's typical job setting are an example of this. On the other hand, learning in work occurs through asking, observing, or coaching while performing one's actual work. These two concepts can also be defined as work-related and work-based learning, respectively.

Terms such as "informal," "non-formal," or "unstructured" are often problematic because they may carry negative connotations. They suggest a lack of instructors, classrooms, interactions, and curricula. This is the main reason why the roles of such learning experiences are open to debate (Billett, 2002; Billett, 2004). Because of workplace learning's conceptual relationship with an organisation's rules, it is typically compared to the formal learning that happens in schools or other

institutions (Billett, 2002). As a result of this comparison, workplace learning is sometimes undervalued. Hager (2004) calls attention to this comparison and approaches the issue from the perspective of formal learning, which assumes that individuals do not know anything and should be taught in a structured way. Knowledge is defined based on the curriculum conveyed from the teacher to the learner and it should be measured accordingly. That is why workplace learning is regarded as unstructured. It is essential to note, however, that there is still a need for structure in the workplace to ensure continuity in practices and guidance based on workplace norms.

As Billett (2002, 2004) observes, the context of learning can be designed to teach individuals how to perform specific jobs. This context can be varied according to different jobs and different organisations. Participation rules and tasks for evaluation can be determined based on particular needs. However, defining workplace learning purely from the perspective of formal learning can be problematic because learning in the workplace may occur as a result of simple engagement without any connection to the organisation. Learning is not the ultimate mission of workplaces, in contrast to schools. However, workplaces aim to foster learning in addition to fulfilling their ultimate work-related missions. Efforts are being made to conceptualise learning on a broader scale that includes the context of workplace learning (Doornbos et al., 2004; Nieuwenhuis & Van Woerkom, 2007).

Graduate education

Graduate education and lifelong learning are interrelationally linked. They can affect each other while being affected by each other. As Steward et al. (2009) state, in this age of transformation into a knowledge society as a result of developing technology and changing world conditions, graduate education has become an issue of key importance. In the last decade of the 20th century, as Altbach (2007) states, the concepts of knowledge society and knowledge economy gained popularity, and they have maintained their places at the centre of social, political, and economic movements. Hence, they have begun shaping developments in these diverse areas. UNESCO (2005) characterises a society and its economy as knowledge-based according to the variety and capacity of its growth. To achieve those qualifications, each society does its best to provide better education

opportunities for its members. In line with this need, higher education institutions, and especially those offering graduate education options linked interrelatedly to the idea of lifelong learning, have gained considerable importance. According to Knight (2007), the only way to create a knowledge-based society with a knowledge-based economy is through graduate education for any society, regardless of its level of development. For developed countries, graduate education means the continuation of knowledge production and the preservation of world-class presence and power.

As in the world, graduate education in Türkiye , as a part of the higher education system, has gained an important place in the context of the need for lifelong learning. Doctoral programs, master's programs, and post-doctoral programs are included in the scope of graduate education. The contents, requirements, and programs of graduate education differ in each university. As mentioned in many studies (e.g., Demirtaslı, 2002; Alhas, 2006), however, graduate education has common points across all universities and so candidates for this education must meet certain scientific criteria. Additionally, to be accepted for enrolment in these programs, certain documents are demanded from candidates and interview protocols and exams are applied. After these selection processes, the universities are responsible for facilitating, conducting, and sustaining graduate education (Clifton, 2009). Graduate education not only provides learners with the credentials of a graduate program but also helps them become self-determined learners. As many researchers have explained (Austin & Wulff, 2004; Austin & Sorcinelli, 2013; Brown, 2003; Lin, & Cranton, 2005; Lovitts, 2005), graduate education has a certain mission to prepare individuals for the future.

In recognition of the importance of the knowledge-based economy, many jobs specify a graduate degree as a prerequisite. Due to this demand, the content range of graduate education and the conditions for participation have increased (Karaman & Bakırcı, 2010). Since the programs offered in graduate education are based on specialisation, they are designed to provide more detailed and deeper knowledge of a subject. At this level of education, in contrast to undergraduate degrees, it is aimed to ensure that students specialise in a subject. In the framework of globalisation, the way to professionalise is through graduate education (Austin & Sorcinelli, 2013). Graduate education focuses on the synthesis of knowledge to produce scholars and

researchers. However, as Çakar (1997) states, today's system of graduate education has different functions. Graduate education must be capable of enabling scholars to build their academic careers in line with its main purpose (Austin & Wulff, 2004). Individuals educated in this way can work scientifically thanks to their ability to synthesise knowledge and critical thinking skills.

As Sayan and Aksu (2005) state, graduate education aims to increase and deepen the expertise of individuals in the context of solving real-world problems. Other researchers (Ince & Korkusuz, 2006; Karaman & Bakırcı, 2010) agree and further explain that graduate education allows academics to conduct research, learn new information, establish problem-result relationships, and produce many ideas for solving different problems. From this point of view, graduate education is not merely a program for gaining a diploma. It is much more than that. Graduate education teaches research skills and how to learn, synthesise information, establish causal relationships among pieces of information, and combine these intellectually with an understanding of ethics and culture in the process of granting that diploma (Ince & Korkusuz, 2006). As a result of graduate education given in this direction, researchers are expected to be able to conduct scientific research, contribute to the literature, synthesise the information in the literature with new information, and produce new findings (Karaman & Bakırcı, 2010).

As Marginson (2010) emphasises, global knowledge societies are built on education and research. From this point of view, it can be said that the main purpose of knowledge societies is to increase human capital on a global scale through education and research. It is thus of global importance that everyone has access to higher education, research, and lifelong learning and is encouraged to participate to ensure the sustainability of information societies. Due to the relationship between knowledge societies and knowledge economies, the importance attributed to scientific work and research is increasing in many countries (Marginson, 2010). Graduate education itself has great importance due to its contributions to productivity and the competence development of human capital (Rospigliosi et al., 2014). Thus, as stated by UNESCO (2008), graduate education has become an investment target for both individuals and countries due to its contributions to human capital production. In the 21st century, universities play particularly important roles, especially in terms of their research aspects, as they advance

countries in competition among knowledge economies and help convert traditional societies to knowledge societies (Altbach, 2013). As Moreau and Leathwood (2006) state, higher education institutions such as universities aim to produce competent human capital that is ready for the market by graduating students as quickly as possible. Graduates, on the other hand, try to make themselves stand out in the competition in the labour market by investing in their personal development even after graduation.

Qualified human capital is a requirement not only for universities but for all sectors of modern life as a necessity of a world based on a knowledge economy (Alhas, 2006). For this reason, one of the prerequisites in employment recruitment has become graduate level education. Based on this demand, the number of graduate education institutions and the variety of conditions demanded of these institutions have increased (Karaman & Bakırcı, 2010). Since human capital-oriented knowledge production is at main focus of developing countries and their economies, the number of higher education graduates and their role in the system is increasing steadily in those countries in particular (Mitra et al., 2011).

Doctoral students

Since the target audience of doctoral studies is adult learners, the concepts of andragogy and adult learning should also be explained while addressing this issue. Adult learning theory was developed by Malcolm Knowles in 1984. Knowles explained the theory through four main assumptions. These are self-concept, experience, readiness to learn, and orientation to learning. Subsequently, motivation to learn was added to these assumptions. Knowles described these five assumptions as follows (Knowles, 1984, p. 12):

1. *Self-concept: "As people become mature, their self-concept moves from one of being a dependent personality toward one of being a self-directed human being."*
2. *Experience: "As people become mature, they accumulate a growing reservoir of experience that becomes an increasing resource for learning."*
3. *Readiness to learn: "As people become mature, their readiness to learn becomes oriented increasingly to the developmental tasks*

of their social roles."

4. *Orientation to learning: "As people become mature, their time perspective changes from one of postponed application of knowledge to immediacy of application, and, accordingly their orientation towards learning shifts from one of subject-centeredness to one of problem centeredness."*
5. *Motivation to learn: "As people mature, the motivation to learn becomes internal."*

Adult learning theory describes adult students and their basic characteristics through certain assumptions. Adults benefit from their life experiences by transferring these experiences, which increase as they grow older, into learning environments. These experiences enable adults to gain motivation and continue their learning. Also, as Galbraith and Fouch (2007) state, sharing experiences with other adult learners increases the motivation to learn and adults benefit from this. Adults have the opportunity to give real-life examples in learning environments based on their personal lives and workplaces. However, adult students may only share their personal and workplace experiences associated with learning in relevant learning environments, as life experiences may be sensitive and confidential. When adults associate learning with their own experiences, their motivation to learn increases. In contrast to children, the perspective of adult learners is more problem-oriented. Adults want to solve the given problem with their knowledge immediately, and this ensures that their motivation is sustainable.

Connectivism

Connectivism combines adult learning principles with personal and professional networks, providing adult educators with a facilitating framework. From this point of view, connectivism can be defined as combining networks that support learning (Abik & Ajhoun, 2012; Bell, 2009; Chatti, Jarke, & Quix, 2010; Tinmaz, 2012). Downes (2010) lists autonomy, openness, connectedness, and diversity as four characteristics of connectivism. According to Siemens (2004), connectivism built on the principle of connection is the starting point of learning. Connectivism and its characteristics emerged further with the studies of Siemens (2005, 2006) and Downes (2005, 2008). Connectivism explains the knowledge-building of people

and institutions with the integration of chaos, network, complexity, and self-organisation theories. Considering the theories on which connectivism is based, it is seen that connectivism has been influenced by the "humanistic adult education" theories of Sartre and Buber (Elias & Merriam, 1995). Sartre and Buber focused on the student-centred approach, taking into account many perspectives affecting learning. Downes (2010) explains the characteristics of connectivism in his blog, Half an Hour, as follows:

> *Autonomy – Learners should be guided and able to guide themselves according to their own goals, purposes, objectives or values.*
>
> *Diversity – A system of educational resources structured so that each person in a society instantiates and represents a unique perspective based on personal experience and insight, constituting a valuable contribution to the whole.*
>
> *Openness – The ability to freely opt in and out of the system while allowing a free flow of ideas and artifacts within the system.*
>
> *Interactivity (Connectedness) – The level of individual immersion in a community or society resulting in knowledge development or transfer.*

As many researchers state in the literature, these four characteristics are used to evaluate the dimensions of connectivism that occur during learning (Kop, 2011; Mackness et al., 2010; Tschofen & Mackness, 2012). According to connectivism, learning should be considered not only as internal knowledge-building but as the whole of the information that can be accessed through external networks. Furthermore, for connectivism, information has a complex structure even if it is not a mysterious phenomenon. From the perspective of connectivists, information is a network and connectivism is used to interpret and synthesise the discovered information (Siemens, 2008).

Connectivism is popular as a method for online learning. It reflects a modern manner of exploring the outside world while making sense of one's online interactions (Dennen & Jones, 2023). Although it is a

prominent framework for studying digital learning environments, it can also be a well-tailored approach for offline learning environments (Guerra, 2023; Omodan, 2023; Rank, 2018). Connectivism enables learners to engage in collaboration and discussion as well as problem-solving, decision-making, and sense-making for knowledge processes regardless of the learning environment.

Connectivism is defined as a theory that gives importance to human agency (Bell, 2011), puts the human in the centre (Bell, 2011), and increases the value of the human (Siemens, 2011). Connectivism's focus on networks and the existence of shared experiences distinguishes it from other theories. When the individual's perspective is examined, it is very easy to see the effect of cumulative network connections. In the literature, researchers have emphasised that the characteristics and basis of connectivism still need to be elucidated and that the individual should receive focus as a separate phenomenon in the context of connectivism (Kop & Fournier, 2010). Many elements influence one's informal learning experiences, including the person's environment, the people in that environment, the interactions between those individuals, the culture, and the relationships between variables. All the variables must be regarded as a whole and the relationships between them must be understood to act to build meaningful links between these variables and understand informal learning experiences. That is why connectivism was selected as an appropriate theory for the present study. In light of the given literature, this study examines the informal workplace learning experiences of Turkish PhD students working in university settings with different job titles.

Method

The experiences of individuals and the attributes given to those experiences are meaningful in qualitative studies (Merriam & Simpson, 2001; Marshall & Rossman, 2006, Merriam & Tisdell, 2016). In this sense, qualitative research designs help researchers reveal the viewpoints of individuals based on their real-life cumulative experiences that occur as a result of certain social interactions (Merriam & Simpson, 2001). Gaining insight into such experiences makes qualitative research designs more interpretive and socially constructed (Creswell, 2013). It is also possible to reveal the feelings, thoughts, and emotions of research participants through qualitative research (Strauss & Corbin, 1990). The

field of education is closely interested in the everyday lives and practices of individuals and qualitative research designs help researchers discover such practices (Merriam & Tisdell, 2016). Qualitative research designs present more information with the help of in-depth interviews. As Manning (2013) states, phenomenology compares the reflections of a homogeneous group of people experiencing the same or similar events. In the present study, phenomenology was used to compare reflections on informal workplace learning experiences among doctoral students who were working at a university while completing their doctorate degrees. The study aims to describe the experiences of this target group in terms of their informal workplace philosophy and psychology (Giorgi, 2009; Moustakas, 1994).

As stated by Van Teijlingen et al. (2001), a pilot study is a miniature version of a study. It is similar to a feasibility report, giving necessary early warnings about the whole study. Hence, it is an essential way to increase the overall success of a study and gain meaningful insights. For the present work, a pilot study was conducted with an accessible PhD student who willingly volunteered. Based on that pilot study, the interview questions, research design, and procedure were revised.

According to Creswell (2013), a convenience sample is possible when the researcher needs to use a naturally formed group, like a classroom or volunteers. Sampling can be based on assumptions that are expected to be discovered and participants from whom the most can be learned can be selected (Patton, 2015). Keeping these points in mind, volunteering participants from whom the most could be learned were conveniently selected for this study during the COVID-19 pandemic in the spring of 2020.

Approval of this qualitative study was obtained from the relevant university's institutional review board. The ethics committee approved the topic and the goal of the study as well as the entire procedure. In this process, the protection of the ethical rights of each participant was ensured. The participants were given information related to the study's approval and their ethical rights. They also received a written copy of the consent form, which again explained the details of the study and their ethical rights. Accordingly, their names and university names were anonymised to ensure confidentiality, and they had the right to withdraw from the study at any time.

The participant information and consent form (Appendix A), describing the study and the ethical rights of the participants, was presented to each participant before the instruments were administered. As research instruments, a demographic information form (Appendix B) and semi-structured interview questions (Appendix C), both prepared by the researchers, were administered to participants online. As stated by Rubin and Rubin (2012), interviewing is an exchange process based on a meaningful relationship between the interviewer and the interviewee. Face-to-face meetings were not possible during the worldwide COVID-19 pandemic, however, so online interviews were conducted individually using the institution's official Zoom software. This provided the benefit of eliminating the time constraints of regular Zoom rooms and contributed to the natural flow of the interviews. In addition, e-mail messages were collected instead of wet-ink signatures to confirm the participants' consent. Only audio recordings of the Zoom conversations were made. The data were organised and analysed without the use of any specific software; the researchers analysed the data with pen and paper based on the content analysis method, which is used to analyse texts systematically way and helps in evaluating large amounts of information (Mayring, 2000; Powers & Knapp, 2006). First, the audio recordings were transcribed. The transcripts were read repeatedly to generate units of meaning. Through this process, textual data emerged. Keeping the research purpose in mind, the researchers revealed central themes driving the essence of the phenomenon of interest. By integrating these themes, the structure of the phenomenon was revealed (Creswell, 2013; Moustakas, 1994). For reliability, the content analysis procedure of the study was conducted individually by each researcher for a few selected samples and their respective results were cross-checked with one another. A high similarity of the content areas was also observed among the analysis for individuals. Thus, the reliability of the data analysis was ensured through member checking.

The participant group of this study consisted of 10 volunteering PhD students working in different university settings with different job titles in Türkiye. In this regard, these participants were experiencing the same phenomenon. The demographics of the participants varied by age, gender, marital status, job title, years of experience, income level, educational background, and department of study. The participants

included eight female and two male PhD students from different settings in Türkiye and they were between the ages of 27-32. Three of the participants were married and only one participant had children. Demographics are a vital component of any research and should be given in both narrative and table format (Connelly, 2013). Therefore, Table 1 provides the demographic data in more detail.

Table 1. Summary Table of Participants' Demographic Information

Name	Year of Birth	Gender	M. Status	Income Level	University (PhD)/Depart./Stage	University (Work)/Depart.)	Work Exp.
Pilot	1986	M	Single	Middle	A University (Foundation) Computational Science and Engineering Thesis	A University (Foundation) R. Assistant (F. Time) R&D Projects (P. Time)	4.5 Years
1.	1988	F	Married	High	B University (Public) Preschool Education Thesis	C University (Public) R. Assistant (F. Time)	6.5 Years
2.	1992	M	Single	Middle	D University (Public) Translation & Interpreting Studies Course	E University (Foundation) English Instructor (F. Time)	2.1 Years
3.	1988	F	Single	Middle	F University (Public) Educational Sciences Thesis	G University (Foundation) R. Assistant (F. Time)	5.8 Years
4.	1991	M	Single	Middle	H University (Public) Molecular Medicine Qualifying	E University (Foundation) R. Assistant (F. Time)	3 Years
5.	1991	F	Single	Middle	I University (Public) PCG Course	K University (Foundation) R. Assistant (F. Time)	5 Years
6.	1992	F	Single	High	L University (Foundation) Clinical Psychology Course	K University (Foundation) R. Assistant (F. Time)	3 Years
7.	1992	F	Single	Middle	D University (Public) Learning Sciences Course	D University (Public) R. Assistant (F. Time)	2 Years
8.	1987	F	Married	Middle	D University (Public) Educational Sciences Sci. Prep.	M University (Foundation) R. Assistant (F. Time)	3.3 Years

Findings and discussion

The collected data were analysed in line with the main focus of how doctoral students experience informal learning in their workplaces. Participants described their informal learning experiences through workday experiences and different work-related responsibilities in and out of the workplace.

Considering the answers given to the semi-structured interview questions, it was seen that all participants depicted their experiences within the framework of common themes. Thus, the informal learning experiences of these doctoral students are discussed here in light of the common patterns and themes.

The data analysis process began with the transcription of the interviews. Afterwards, the six-stage analysis process described by Smith et al. (2009) was followed. In the first stage, the transcribed interviews were read once by each researcher to establish familiarity and comprehensive understanding. In the second stage, the answers given to each question were descriptively noted by the researchers separately for each participant. Significant quotes were highlighted. In the third stage, the descriptive notes for each question were coded. In the fourth stage, those codes were combined according to their similarities and main themes were formed. In the fifth stage, the patterns within the themes were examined for each question and between questions. In the last stage, the themes were finalised considering those patterns. This analysis process was carried out by each researcher separately. Their final analyses were compared and the trustworthiness of the process was confirmed. The themes for each interview question arising from this analysis are given in Table 2. Each column shows the themes drawn from the relevant question as listed across the top row.

Table 2. Table of Themes

Q1 (Intro)	Q2 (Workplace roles and experiences)	Q2.1 (Reflections from a typical day in the workplace)	Q2.2 (Reflections from the first weeks in the workplace)	Q3 (Advantages of working in academic setting)	Q4 (Mutual benefits of doctorate and workplace)	Q5 (Alternative learning paths to workplace)
Ice breaker	Workload as a teacher/instructor/ lab assistant/research assistant	Flexible working hours	Familiar environment	Financial support	Similar academic environments	More time for literature review
	Various roles	Shared office rooms/busy/ distraction	Constructing a new faculty experience	Contribution to academic excellence	Not totally matching but related	More time for learning through different projects or platforms
	Not clear job description	Typical workday	First day anxiety	Theory-practice opportunity	Informal learning opportunities	
	No job satisfaction	Time for personal academic work	No orientation	Social Learning among colleagues	Easy access to academic network	
	Paperwork		Mutual support relation between colleagues	Difficulty managing two roles		

Although many of the participants revealed that they did not have clear job descriptions, they generally worked in universities as research assistants (Participants 1, 3, 4, 5, 6, 7, 8, and 10). Additionally, most of them had begun working while completing their master's degrees. As described in the literature, research assistants are entitled to participate in research studies and to oversee courses as instructors (Sayan & Aksu, 2005; Sevinç, 2001). However, during the interviews, many participants stated that they had not yet had a chance to be an instructor due to operational issues in their universities:

Participant 3 (Female): "... Actually we do not teach as assistants. We do not have such a job description, but we have some certain responsibilities for the given courses..."

Participant 4 (Male): "My responsibility is to assist the professors in lab courses…"

Although they had not received any orientation during the first week of their jobs, they were in charge of many duties without clear descriptions in their workplaces. These roles included supporting senior lecturers with technology, attending classes, and working as department secretaries, coordinators, student assistants, lab assistants, and teaching assistants. Participants who stated that they had no idea about which tasks they were responsible for described themselves as being confused within a jungle of roles:

> *Participant 5 (Female): "… This year I also give 2 courses. Additionally, I prepare curriculums, course programs, exam programs and I organise them. I work as a proctor in exams. There is no job definition for a research assistant. Individually, we struggle to do research with our professors…"*

> *Participant 1 (Female): "We do not do research here or do not publish anything and nobody cares about it. We just work… Generally, paperwork… We do the things that are done by bureaucrats in other organisations."*

However, they also explained that thanks to this role confusion, they developed their skills and knowledge in many areas because they had many different experiences and worked with many different academics, even if they were often overwhelmed. Many of these experiences provided the participants with new perspectives because of informal learning. For example, when five participants (Participants 3, 5, 6, 8, and 10) started working as research assistants, their universities were newly established. For this reason, as a result of their roles, responsibilities, and interactions in the establishment process, they gained significant experience regarding how to establish a university or faculty:

> *Participant 7 (Female): "On the one hand, the subject of research comes out. For example, if there is a subject with science, I can adapt it to mathematics through the person I talk to. Because it allows me to look from a wider perspective. Apart from that, for example, I learn from my research assistant friends that it will make it easier for me to do my academic work. In other words,*

> *"Look, there was such a program", "It worked very well while making a transcript", "If you look at this source, you can find the pdf of the books there", "You can reach the articles more easily", "How do you use it with the university network?" You learn technical but life-saving information because you know people and you are familiar with the culture. Also, they are closer to me as we age, and we understand each other's language better. They are closer both by age and by experience. I think I learned different things from them."*

Participants who worked at the same university where they obtained their bachelor's or master's degrees (Participants 4 and 7) stated that, although they did not have an orientation, they always found support in the process of adapting to their roles thanks to the confidence they felt from working in a familiar environment and the support they received from colleagues who started working in the same period. They stated that these were the factors that supported their social and informal learning the most:

> *Participant 1 (Female): "We share the room with other assistants of other departments. They have different backgrounds. We support one another academically. We discuss academic issues all the time together, we consult one another and learn from one another, which is supporting and contributing..."*

When asked to depict a day in the workplace, all participants, without exception, expressed how grateful they were for the flexibility of their working hours and that they could schedule their days as they wished. Apart from mandatory meetings, they said that by dividing their day into two, they could perform their research assistant responsibilities in one half of the day and focus on their academic work in the other half. They described this routine as constituting their typical working days:

> *Participant 10 (Female): "Under normal circumstances, if I do not have a task from the previous day, I work on my thesis. So, I study for my thesis, I work for the proficiency exam, I read some literature... something that is completely up to me is actually how I manage the day. My day starts with my choices."*

> *Participant 5 (Female): "We can spare time for ourselves. We are not dictated to come and do the following tasks. Tasks are given*

> *beforehand. Since it has a delivery date, we can make our own plan so that I will deliver it on that date… Apart from that, I can take time for myself and create a working environment at my desk."*

> *Participant 10 (Female): "I have been concentrating on office work in the morning all the remaining time… I [do that work] in the first place because I feel like my job is the responsibility of the university. In the afternoon, I begin to return to my [own] work a little bit. If I have time, if I have homework, I look at it a bit. If I need to look at something in the literature, I look at it… Normally, when we started to work, especially the academics who had no university experience work between 9 am and 5 pm. As a person who still claims that the university will not be such a place, I sometimes go to work at 10 am and leave at 7 pm. Sometimes I come early in the morning and leave at 3 pm. I try to use the day more comfortably at intervals."*

When asked to explain what they were gaining while working and completing their doctorate degrees, they emphasised the different benefits of being both a student and a working individual. The first of these was that working gives them financial support to continue their education. Furthermore, they had opportunities to increase their expertise and skills through informal and social learning. In addition, they had the chance to put the theories they learned during their educational lives into practice and learn via "living by doing."

As stated by the participants during the interviews and supported by the literature, students completing PhD degrees aim to become faculty members after graduation. For this reason, working at a university offers many opportunities to prepare them for the future and ensure that they are familiar with professional processes. In addition, it offers many opportunities for them to create academic networks:

> *Participant 7 (Female): "…I think it is an opportunity to learn. Because…think like this. I am at the university, there are a lot of people that I can ask about anything I can think of right now. Because of the academic environment… everyone works mostly in academic jobs there. I also learn administrative affairs. This is actually not about my doctoral process, but about the post. If*

> *I become an academic, I learn how the process progresses. But as I said, I can knock on the door of academics when there are questions in my head…if they are available. I can ask them and learn something. Let's say I want to do an academic study and I want to be a researcher. We are constantly intertwined with academics. I can see and hear what they are working on. We share the same kitchen with teachers. Even while having tea, coffee, and breakfast there, I transfer what I learned in a PhD course to a teacher. I learn a lot from our teacher about it."*

When asked what they would have done if they were not working towards becoming a faculty member after graduation, most participants stated that they would prefer to remain in the academic community and seek a different job, even if they were not research assistants. However, if they did not have other work, they stated that they would prefer to try to learn more about the relevant literature by spending time in the library:

> *Participant 6 (Female): "I have a library habit. It was always like this while studying at university. I'm a library lover, a person who loves to work in a library. So I think I would probably go to the regular library. At least I would try to go as far as possible. I could work harder like this."*

Even though there was no direct interview question regarding connectivism, these findings relate to the four characteristics of connectivism. In terms of autonomy, the participants had opportunities to guide themselves according to their expertise by connecting with senior academics and assisting with their courses. In addition, they could create cumulative network connections with their professors, senior lecturers, or other senior staff of the university. For example, they could co-work on a study or could participate in academic conversations. In terms of diversity, based on their experiences the participants could contribute to the overall system through their academic efforts and products. In terms of openness, however, the participants had little space to opt in and out of the system because of the hierarchical structure of universities in Türkiye. In terms of interactivity, the participants were aware of the power and necessity of connectedness and interactivity to survive in such a system. Interactivity and cumulative network connections develop each other. Overall, the data

obtained in this study reflect the main characteristics of connectivism, which plays a major role in the workplace experiences of PhD students.

On a general level, the participants explained what they have gained from informal learning opportunities in their workplaces. They stated that even if they encountered difficulties when they began working, they overcame those difficulties thanks to their friends' support and social learning. Participants who worked as research assistants stated that they had many roles and responsibilities due to their titles and they had no clear job descriptions arising from that confusion. However, they emphasised that they gained significant experience due to this variety of duties and responsibilities. They also stated that, during these experiences, they had opportunities for informal learning and social learning through interactions with colleagues and senior academic staff.

Furthermore, they explained that with the advantage of flexible working hours, they could easily fulfil their responsibilities as students. The fact that they worked in an academic environment helped these PhD students gain the necessary knowledge and skills for their future goals. Looking at the responses given, they stated that, even if they did not have their current jobs, they would still be looking for similar work as they would prefer to remain in an academic environment.

Conclusion

This study has aimed to explore the informal workplace experiences of PhD students working in university settings. The findings have revealed that doctoral students working at universities with different job titles learn in their workplaces by participating in various work-related tasks, collaborating with their colleagues and other people, and encountering new tasks that create learning opportunities for them. Unexpected challenges, tasks, and office conversations that are not directly related to their job descriptions had essential roles in the learning and skill acquisition of the participants in this study. In this population, learning primarily happens as a result of the interactions of PhD students with other individuals, various work or non-work-related activities, and the general context (Unluhisarcıklı, 2018). Learning emerges from the everyday practices of work and social contexts. Many participants emphasised that when they compared their PhD course experiences with their workplace experiences, although they could find aspects

common to both, there were also many ways in which they diverged. For instance, the PhD students participated in scholarly activities such as writing articles and publishing books through their course experiences, whereas they facilitated the smooth continuation of bureaucratic processes by overseeing paperwork in their workplace experiences. In light of the literature and the findings of this study, it can be said that the workplace offers different learning experiences by supporting PhD students in learning practical knowledge or know-how and in terms of tacit or implicit knowledge (Mitchell, Henry, & Young, 2001). However, the PhD students participating in this study also highlighted that their workplace learning experiences, in terms of participating in various work-related tasks, encountering new challenges, and collaborating with their colleagues and other academics, were not related to their doctoral learning experiences but rather to the flow of business life and bureaucratic processes. In this respect, this study contradicts the literature. In addition, it has been reported that the informal workplace learning experiences of doctoral students working in university environments can provide them with many skills and knowledge that they can use (Unluhisarcıklı, 2018). In fact, workplace practices cannot be separated from learning, as they are intertwined. Much of the previous research on informal workplace learning has focused on how informal learning occurs in the activities of daily life without any certain aim or structure (Merriam et al., 2007). This learning can occur as a result of the socialisation of adults, with or without their awareness and intention (Livingstone, 2001). Regarding the four characteristics of connectivism, Turkish PhD students working in academic settings have the autonomy to lead themselves by engaging with senior faculty members and assisting them. Furthermore, students can also establish cumulative network connections with such people. They can add to the diversity of the overall system through their experiences. Because of the hierarchical structure of Turkish universities, PhD students have little freedom to opt in or out of the system. In this context, they highly value the interactivity that exists. The interactions of PhD students with other individuals in the workplace context result in learning, and so it is embodied in the everyday practices of work and social context. Similar findings emerged from Unluhisarcıklı's (2018) study conducted in an American context. However, the different structure of graduate education and differences in the job descriptions of graduate students in Türkiye resulted in country-specific findings in the present

study. As also noted in the literature, one of the largest problems in the Turkish graduate education system is that PhD students are hired as research assistants or lecturers, but there are no clear definitions of these titles within the system. PhD students working in university settings with such titles are expected to perform secretarial tasks like preparing timetables or reserving classrooms. This causes PhD students to experience role conflicts. As a result, demotivated doctoral students struggle with many problems such as stress related to the work environment, limited opportunities for promotion, lack of support, lack of participation in decision-making processes, and lack of professionalisation opportunities. The present study contributes to the literature on graduate education by providing the findings of qualitative research specifically addressing the case of PhD students working in Turkish university settings. Understanding the processes of informal learning for PhD students provides useful insights for other work-integrated education programs. In addition, the target participants of this study included PhD students working in both public and foundation universities in Türkiye, which increased the representativity of the study. Additional steps to move this research forward could include repeating the study with a more gender-balanced target participant group, creating wider participant pools, and analysing the data with a cross-cultural perspective. Therefore, further research is needed to provide a more detailed exploration of the informal workplace experiences of PhD students considering the limitations of the present study.

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APPENDIX – A: PARTICIPANT INFORMATION AND CONSENT FORM

This form was removed from the appendix to avoid revealing the university name during the manuscript review process. It can be provided via e-mail on demand.

APPENDIX – B: DEMOGRAPHIC INFORMATION FORM

1. Participant Code: .....
2. Year of Birth: .....
3. Gender:

☐Female ☐Male ☐Other

4. Your marital status:

☐Single ☐Married ☐Other (.....)

5. Number of Children: .....
6. Income Level:

☐Very Low ☐Low ☐Middle ☐High

7. Your job description at the university: .....

☐Part-Time ☐Full-time ☐Other (.....)

8. Work experience: ..... day/month/year
9. University / department / stage information of your doctoral program: ....
10. Previous educational background information (university/department/graduation year:

☐Bachelor: .....

☐Master of Arts: .....

☐PhD: .....

11. Additional information (if you wish):

APPENDIX – C: SEMI-STRUCTURED INTERVIEW QUESTIONS

1. Can you tell us about your doctorate and academic studies?
2. Can you explain your work life and your duties/responsibilities there?

2.1. Can you describe your experiences on a typical day at the workplace?

2.2. Can you describe your experiences during your first weeks in the workplace?

3. What are the advantages of working in this job during your doctorate?
4. What are the benefits of what you learn in your doctorate and at work for each other?
5. If you were not working during your doctorate, which path would you follow to specialise professionally?

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Exploring the effects of working practice in cultivating Chinese university teachers' professional identity

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The study explores the effects of working practice in cultivating Chinese university teachers' professional identities. It collects data from questions delivered in a presentation forum and individual interviews. After analysing data the study gets the following findings. Firstly, the reasons for participants choosing to be university teachers include personal interests and job satisfaction. Secondly, after working for some years, participants' professional identities change significantly. They understand their position deeply, becoming more interested in their jobs, setting up more apparent professional goals or missions, and highlighting their moral levels and working ethics. Thirdly, working practice helps participants build clear professional plans. They expect to promote their teaching capabilities, communication abilities, and moral levels. Fourthly, working practice helps participants set up a strong sense of belongingness as university teachers. They care about other's opinions of their group. The findings illustrate that working practice can improve Chinese university teachers' professional identity, which can be explained by

the collectivism of Chinese culture.

***Keywords**: Chinese, professional identity, university teacher, working practice*

Introduction

Professional identity is understood as an individual's understanding of one's professional interests, values, identifications, and ambitions (Kira & Balkin, 2014; Vähäsantanen, 2022; Vähäsantanen, Hökkä, Paloniemi, Herranen, & Eteläpelto, 2017). It is one of the most important factors that influence one's attitude and the development of one's career. Professional identity is an important part of organisational cultures and structures (Billett, 2010; Harteis, 2018). It is at the core of individual and organisational development. Professional identity includes individuals' previous experiences; current professional interests, goals, values, and ambitions; and prospects, orientations, and career plans (Brown, 2015; Kira & Balkin, 2014). Scholars (Miscenko & Day, 2016) believe that the sense of belonging to a group is essential to professional identity as well. Professional identity, therefore, can be revealed by the following questions (Brown, 2015; Kira & Balkin, 2014; Miscenko & Day, 2016): "How have I become a professional?" "Who am I as a professional at the moment?" "Who do I want to become as a professional in the future?" "Who are we together as professionals, or as a group at work?" Scholars have studied professional identity for many years. Previous findings have reported that professional identity is influenced, shaped, and even determined by the social environment (Billett, 2010; Eteläpelto, 2008); and it is changeable and flexible (Akkerman & Meijer, 2011; Brown, 2015). Thus, it is necessary to study professional identity in different cultures and social environments.

Scholars have proposed some methods to promote professionals' identity, such as the masks method (Leitch, 2010), the professional body method (Vähäsantanen, Hökkä, Paloniemi, Herranen, & Eteläpelto, 2017), and the visual narrative method (Kosonen, 2018). However, those methods are within separate or independent training sessions and work-related interventions (Vähäsantanen, 2022). It is necessary to find ways to improve professional identities in authentic working environments.

In addition, previous studies of professionals' identity are qualitative studies, collecting data with the methods of storytelling (Leitch, 2010; Vähäsantanen, Hökkä, Paloniemi, Herranen, & Eteläpelto, 2017) or interview (Kosonen, 2018). Qualitative research enables researchers to delve into the complexities of human experiences and gain a deeper understanding of the phenomena under investigation, but it usually focuses on limited research subjects. It is better to widen a study's breadth and collect data from diverse participants.

Learning in a workplace is vital for promoting individuals' working skills. Workplace learning provides practical experience in individuals' authentic work environments. It offers individuals opportunities to get skill-based training and gain valuable hands-on skills applied in a particular occupational field (Liu, Liu, & Hariyanto, 2020). Scholars have studied how teachers' emotions affect their workplace learning (Huang, Lee, & Frenzel, 2020) and how workplace learning improves teachers' leadership and self-efficacy (Liu & Hallinger, 2018) in China. This study will explore the effects of working practice in promoting university teachers' professional identity and uncover the relationship between working practice and the professional identity of Chinese university teachers.

Methodology

The study is a qualitative one, approved by the Committee of Ethics and Integrity in Research with Humans at Tianjin Chengjian University. It collected data about Chinese university teachers' viewpoints on the relationship between working practice and their professional identity from a presentation forum and some individual interviews. The research team analysed the collected data back-to-back with each's understanding of the data first, and then with some discussions. Finally, the research team got congruous opinions on the results.

Education departments and universities in China highlight cultivating university teachers' professional ethics and teaching capabilities. Almost every year they offer some face-to-face, online, or hybrid programs to improve teachers' professional ethics and teaching capabilities. Usually, teachers who have teaching experience of fewer than three years are required to participate in these programs. In the summer break of 2021, the first author of the article delivered a presentation on

university teachers' professional identity online in one of the programs. Eight hundred and fifty-five teachers took part in the program. After the presentation, the speaker delivered the following questions in the program forum:

1. What is/are the reason(s) for you to choose being a university teacher?
2. How do your teaching practices change your understanding of being a university teacher, such as your professional goals, missions, interests, values, and ethics?
3. In which way do your teaching practices change your career plans?
4. What does your sense of belonging change after you become a university teacher for some years?

Participants were required to give their opinions on these questions. At the same time, they were asked to comment on their peers' opinions. Finally, 820 participants finished all the discussions. Among them, 434 (52.9%) were female teachers, and 386 (47.1%) were male teachers; 315 teachers (38.4%) were with teaching experience of under one year, 285 teachers (34.8%) between one and two years, and 220 teachers (26.8%) between two and three years. Participants' disciplines are diverse, including arts, engineering, humanities, sciences, and social sciences.

After the participants finished their discussion and the research team finished analysing the data, the research team interviewed 5 female teachers and 5 male teachers; all of them are interested in professional identity; they come from diverse disciplines, with two teachers coming from arts, engineering, humanities, sciences, and social sciences, respectively. They were invited to explain their viewpoints about the relationship between working practice and their professional identity in detail.

Findings

Reasons for participants to be university teachers can be categorised into three kinds. The first is that they like university teaching positions, which was mentioned by 68% of participants. However, the reasons for participants to be university teachers varied. 38% of participants

like teaching and researching; 33% of participants enjoy the high social position that university teachers bring to them; 22% of participants highlight university teachers' salaries; other opinions include a friendly working environment or the opportunities to contact diverse cultures. The second reason is that university teachers are the best choice for their disciplines, which is mentioned by 23% of participants. Those who mention this reason usually come from disciplines of humanity or social sciences. In an interview, one participant tells the research team that her discipline is Chinese Literature, and her interest is writing; she does not like teaching; to make a living and continue her writing, she has to choose a university teacher as her job. The third reason is that participants are influenced by some important persons, which is mentioned by 9% of participants. "My mother is a university teacher. She encourages me to be a university teacher." "My supervisor is an influential scholar in my discipline. He encourages me to be a university teacher." The above are the most representative opinions expressed by participants.

Regarding the changes in their understanding of being university teachers, participants' opinions can be summarised as follows. Becoming more interested in teaching positions is mentioned by 83% of participants. Typical expressions related to this opinion are as follows: "I have found teaching at university is an interesting job." "I have found teaching at a university matches my professional interests." The opinion that working practices have shaped participants' professional goals or missions is expressed by more than 78% of participants. Typical expressions are as follows: "After three years of teaching, I understand deeper than before that as a university teacher I should put the task of cultivating students as my essential duty." "Working as a university teacher for two years, I understand that my professional goal is to cultivate more and more excellent students." Working practices have taught participants that their moral level and working ethics are essential factors in their professional careers, which is expressed by 75% of participants. Typical expressions are as follows: "My teaching practices have taught me that the moral level is more important than the professional level in my career." "I have learned that a good teacher must be a person whose moral level is high."

Regarding the change in participants' career plans, participants' essential opinions are as follows. First, they expect to improve their

teaching capabilities, which is expressed by 95% of participants. Typical expressions are as follows: "As a new teacher, I need to improve my teaching abilities." "To become a good teacher, I have to learn more teaching abilities." Second, 92% of participants expect to improve their communication abilities. Typical expressions are as follows: "I want to be friends with my students. I, therefore, expect to improve my communication abilities." "I am a new teacher in a new working environment. It is an urgent task for me to improve my communication abilities and know my colleagues well." Third, 85% of participants expect to learn from some model teachers and improve their moral levels. Typical expressions are as follows: "A teacher's moral level is as important as one's professional level in the development of one's career. I, therefore, expect to learn from others and improve my moral levels." "In students' eyes, teachers are their examples. To cultivate excellent students, I will try to improve my moral levels."

Participants' changes in their sense of belongingness are similar to each other. Before they became university teachers, they usually saw themselves as members of student communities or their families. When they met problems or expected to share something with others, they talked with their classmates or family members. After they become university teachers, they view themselves as community members of their universities and their disciplines. Some typical expressions are as follows: "I often share teaching skills with teachers at my university. I believe we have similar questions in teaching and can help each other." "I often participate in conferences related to my discipline, in which I can meet peers who can transfer their research experience to me." "I enjoy making friends with university teachers as we have similar interests and professional aims." Participants believe all university teachers in China are in a community. They care about other's opinions of their community. "All university teachers have to establish a responsible and knowledgeable social status for university teachers. I believe the majority of university teachers are with high moral levels. Those with bad behaviours are few. They should be eliminated from the group. We are different from them." One university teacher tells the research team in a review. The aforementioned data show that university teachers see themselves as a community. They highlight other's viewpoints toward the community.

Discussion and conclusion

The research findings reveal that the reasons for participants to be university teachers include personal interests and job satisfaction (high social position or salary), which is similar to the opinion of a previous study (Tang, 2019). China is a developing country growing fast. Ordinary individuals in China are neither very rich nor very poor. When they select jobs, they usually think about both their interests and their sense of satisfaction with the job.

After working for one to three years, participants' professional identities changed significantly. They understand their position deeply, becoming more interested in their jobs, setting up more apparent professional goals or missions, and highlighting their moral levels and working ethics. These changes can be explained by the term core reflection, which is regarded as an academic's professional orientation (Korthagen, 2004). A period of job practice helps participants realize that their positions can help them achieve their values, which strengthens their core reflection and confirms their professional orientation. Thus, participants set up clearer professional goals or missions. A previous study has reported that individuals become more aware of their career qualities through core reflection, and thus core reflection leads to self-understanding of one's job choice (Arvaja, 2018). It is still not clear whether job practice influences one's core reflection or core reflection affects one's career, or whether the two factors influence each other mutually, which is required to be studied in the future.

Working practice helps participants build clear professional plans. They expect to improve their teaching capabilities, communication abilities, and moral levels. A previous study has reported that university teachers' work encompasses a range of tasks, including educational responsibility and technology-enhanced duties (Fejes & Köpsén, 2014). The current study finds that Chinese university teachers highlight improving their moral levels, which reveals the differences in university teachers' duties in different countries. According to Chinese culture, only a knowledgeable person with a high moral level can become a teacher; teachers are regarded as other persons' models on a moral level. Chinese teachers, therefore, highlight improving their moral levels.

Working practice helps participants build a strong sense of belongingness as university teachers. They care about other's opinions

of their group. Previous studies have reported that Chinese university teachers hold a strong collective professional identity (Yao, 2020; 2021), which is similar to the findings of the current study. Chinese culture highlights collectivism. Individuals in China are willing to contribute to a group. They care about others' opinions of their group more than toward them. Chinese culture cultivates Chinese university teachers' strong sense of belongingness as university teachers.

The study reveals the effects of working practice in cultivating Chinese university teachers' professional identities. The findings of the study have uncovered the hallmark of Chinese university teachers' professional identities. Strategies for building adaptability and a supportive work environment can be developed based on the findings of the study. The study has significant implications as well. Firstly, teacher schools are required to pay more attention to working practices in fostering future teachers' professional identities. Secondly, school managers don't have to worry about novice teachers' professional identities too much, as their professional identities can be improved by their working practice. Thirdly, findings in the study can help adult educators in adapting to new work environments and fostering a sense of belonging within educational institutions; Strategies for building adaptability and a supportive work environment can be developed based on these insights.

As we know, Chinese culture has influenced countries in East Asia and Southeast Asia deeply. These countries highlight collectivism as well. The findings in the study, therefore, can reveal the relationship between working practice and the professional identity of university teachers in other countries in East Asia and Southeast Asia.

Looking back on the current study, we find some limitations. Firstly, the research gets data from participants' retrospective information, which may decrease the vitality of the study. Secondly, the study expects to explore the effects of working practice in cultivating university teachers' professional identities. However, during their working period, university teachers have participated in some training programs, such as the summer training program from which the study gets the data. It is better to explore the effects of working practice in cultivating teachers' professional identity without the interruption of other factors, such as pieces training. Thirdly, parts of the data are collected by the

method of interview. Due to time limitations, the study only reviewed 10 participants. It is better to enlarge the number of participants reviewed in a study.

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Book review

Map it: The hands-on guide to strategic training design

Cathy Moore
Montesa Press, 2017
418 pages

Reviewed by Lexi Keeton
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Cathy Moore's book first piqued my interest when I was transitioning from studying the Master of Applied Learning and Teaching at Deakin University, to working in the education consulting industry as a Learning Designer. I enjoy learning while I'm being active – exercising, gardening, travelling, walking my poodle – that allows the new ideas to wash over me and marinate as I work. I got into watching videos by instructional design YouTuber, Devlin Peck who highly sings the praises of *Map It*, by Cathy Moore.

Moore's book begins by discussing the current state of education and training in the same light as my master's degree - that learners are not vessels to be filled with knowledge. While this paradigm has been understood since the days of Dewey (1938), societies shift from rote to

active learning has been challenging and remains incomplete because as Moore puts it, "it's hard to imagine what else it could be." Without practical approaches to evolving our teaching practice, we fall back on what has been modelled for us, perpetuating a didactic method of teach-then-test. Cathy Moore's book, Map It, the hands-on guide to strategic training and design fills this skills gap by providing a simple framework to create engaging and impactful learning experiences in any context – action mapping.

Who is a learning designer?

In Australia, Learning Design is a more common role title than instructional designer though they may be used interchangeably. The most notable difference in my opinion is that instructional design is a term used alongside Learning and Development 'L&D' roles that sit within Human Resource departments for internal corporate training. Learning Design can encompass corporate training as well but may be more focused on formal education pathways with set learning outcomes and assessment structures.

Map It is presented in the context of the latter. Moore's experience is as an internal or external consultant working with businesses for employee development. While my new career as a learning designer was to be consulting mostly with universities and vocational education and training programs, I could see from Peck's videos that *Map It* was underpinned by the same adult learning principles I had spent two years studying, writing about, and researching. I was keen to see if the book could help bridge the gap between my academic experience to working "in the real world".

The role of a learning designer varies greatly depending on the context. The problem that Moore's book is trying to solve is in response to the very common engagement brief given to learning designers:

1. We need a course to teach a X.
2. The content is ready – here are the PowerPoint slides to build as a course.

Moore urges the reader/designer to challenge the status quo by (1)

removing the assumption that a course is the correct solution and (2) written content equals learning.

Applied learning and design thinking themes

Overlapping themes between action mapping and applied learning were immediately evident: Both acknowledge that the most effective way to ensure learning outcomes are met is through a student-centred approach that embeds learner agency in the course design and ensures content and assessments are relevant to what learners will do in the real world.

There are reasons instructional designers are called *designers*. Moore points out that it is the role of the designer to guide stakeholders in the direction of the solution which will best meet the needs of the client. Creative consulting industries have adopted the design thinking framework to help guide the process of 'doing the work'.

At the same time, action mapping bridges to design thinking with its iterative method. The repeated cycles of prototyping and refinement balance philosophical ideals with tangible design skills. Action mapping enables learning designers to create authentic experiences focused on hands-on application and continuous improvement. It's a powerful framework for leveraging both theory and practice.

- User centred (student centred, empathy)
- Define the problem (what should learners be able to do)
- Iterative design (prototyping and feedback process)

Cathy Moore's action mapping

Cathy Moore's action mapping methodology leverages the highly complementary applied learning ideals and design thinking methods to provide learning designers with a practical toolkit to implement active, student-centred pedagogy. The book takes readers through the entire end-to-end design process. Moore models how to create a collaborative environment with all stakeholders on the design team. She identifies peaks and troughs the designer can expect to encounter and provides expert advice on how to best work with their subject matter expert, as a great working relationship can make all the difference to the finished product, which I echo from my own professional experience.

The mapping process transforms theoretical principles into concrete outcomes by starting with learner needs and real-world relevance. This grounds the approach in applied learning theory.

Action mapping empowers learning designers to guide stakeholders by framing the conversation around learner-centric solutions. The iterative approach allows fluidity in responding to emerging requirements and priorities. Storyboarding enables transparency rather than rigid adherence to initial plans. At its core, action mapping draws on design thinking to position learning designers as creative partners in achieving outcomes, not just as technicians implementing fixed instructions.

Conclusion

In conclusion, *Map It* empowers anyone designing adult learning with a practical toolkit, underpinned by solid pedagogical theory. However, while my personal experience and education illuminated the usefulness of Moore's action mapping, I'm concerned that the consistent corporate examples and business terminology risk excluding wider audiences. The book's questioning of whether a course needs to be made at all could create an illusion of separation from academic settings that don't afford such a challenge. Incorporating more examples from universities, schools and community programs would bridge this gap and showcase the broad applicability that originally drew me in.

Additionally, the pages of the book could greatly benefit from the addition of varied visuals like illustrations, high-fidelity diagrams and graphic signposting would breathe life into the design while demonstrating the creativity that Moore aims to inspire. None-the-less I heartily recommend Map It to anyone interested in creating engaging and meaningful adult learning experiences.

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Call for Papers

Special Edition: Australian Journal of Adult Learning

Power, policies, and practices in adult literacies

***Guest editors**: Susan M. Holloway is an Associate Professor in the Faculty of Education at the University of Windsor, Windsor, Ontario, Canada. Patricia A. Gouthro is a Professor in the Faculty of Education at Mount Saint Vincent University, Halifax, Nova Scotia, Canada.*

The term "literacy" has shifted to "literacies" in recent years as critical educational discourses recognise the multiplicity of learning experiences encompassed in the fields of critical literacy, New Literacy Studies, multiliteracies, and sociocultural approaches to additional language learning. The plurality of literacies speaks to the pressing need to find relevant ways to communicate about increasingly complex issues in a fast-paced world.

Traditionally, literacy has been narrowly defined as the technical ability to read and write. This definition still holds great currency amongst policy makers and the public in many countries, who also often believe in the premise of Human Capital Theory that perceives education as an investment for fast economic growth and a quick solution to workforce skill shortages. In the field of adult education, Paulo Freire's (1970/2005) seminal work on critical literacy and its focus on problem posing resulted in the empowerment of adults through language,

dialogical engagement, and recognition of adults' abilities to change the oppressive status quo, as seen through many successful popular education literacy campaigns across the globe (Finnegan, 2021). This focus on how power shapes learning continues to resonate in societies shaped by mass migration, evolving technologies, and a neoliberal climate, to reflect on what it means for adults to be considered literate. What has shifted is a focus on language as a socially situated practice (Barton & Hamilton, 2000) – meaning that everyday communications such as sending a text, creating a playlist, or asking directions in another language, contribute to how meaning is made and interpreted.

This Special Issue of the Australian Journal of Adult Learning (AJAL) will explore various trends developing at the forefront of literacies in adult education, to consider ways that literacies are being defined and enacted in current times in research and practice. We encourage submissions from around the globe about literacies that relate to these four fields:

- Critical literacy
- New literacy studies
- Multiliteracies
- Sociocultural approaches to additional language learning in adult education

Each of these four areas of literacies draw attention to ways in which power continues to shape and impact adult learning experiences. Critical literacy may draw upon a Freirian analysis or the Frankfurt school of critical theory, which examines power relations through concepts such as ideological critique, that question the underlying assumptions of power structures often embedded in dominant discourses. Critical literacies may also consider a range of access and inclusion issues, looking at factors such as gender, Indigeneity, ability, age, race, culture, and/or social class. In this ongoing epistemological shift, New Literacy Studies has significantly advanced our understanding of the larger societal implications of Web 2.0 technologies: "In a world where electronically produced text carries meaning, exclusion from digital technologies can have disempowering consequences – especially for life in the home, community and workplace" (Hamilton, Tett, & Crowther, 2012, p. 4). Multiliteracies, like New Literacy Studies,

acknowledge the power dynamics of literacies to shape identities and technological advances. Multiliteracies focus on deepening and expanding forms of communication through multimodality and cultural diversity (Kalantzis et al., 2016). The broader concept of literacies also undergirds sociocultural approaches to additional language learning, which recognise the need to affirm multilingual students' identities in the face of coercive societal power relations that devalue Culturally and Linguistically Diverse learners' home cultures and languages (Cummins, 2021).

Proposals for the following types of papers that address literacies in adult learning will be considered

- Advancing theoretical discourses on literacy
- Disseminating new research on literacy
- Critiquing Human Capital Theory approaches to literacy policies
- Reporting on literacy programs or stories of practice teaching literacy (from practitioners in the field)

Types of contributions welcome

Abstracts should be 300-500 words (excluding references) to be sent directly to the Guest Editors to their email address (please see email addresses below).

Academic papers of 6000 to 6,500 words in length including references, tables, data and figures will be blind double, external peer reviewed to be submitted via the *AJAL* portal.

Stories of practice of up to 3,000 words in length including references, tables, data and figures will be reviewed by editors to be submitted via the *AJAL* portal.

AJAL submission and author guidelines

https://www.ajal.net.au/peerreview/index.php/ajal/about/submissions

Timeline

- Abstracts due on February 1, 2024.
- Outcomes of Guest Editors' decisions on accepted abstracts communicated by March 1, 2024.
- Papers due on May 15, 2024.
- Review period and feedback is from May – August 2024.
- Finalisation of Paper in September 2024.
- Final Papers for copy editing due on October 1, 2024.
- Publication for November 2024.

Inquiries can be submitted to the Special Edition Guest Editors via email

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