Learning through healthcare work: Premises, contributions and practices

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Abstract

Learning through work has long been important for the development of healthcare workers' occupational competence. Yet, to effectively utilise this mode of learning, its particular qualities and contributions need to be understood and optimised and its limitations redressed. By optimising the experiences healthcare workplaces provide, augmenting their learning potential and promoting workers' engagement with them can, together, assist these workers' ability to respond to future occupational challenges. Importantly, such considerations can be used to understand and appraise workplaces as learning environments on their own terms. Here, the concepts of practice curriculum and pedagogies, and workers' personal epistemologies (i.e. what individuals know, can do and value) are described and advanced as practical bases for optimising learning in and for healthcare workplaces now and for the future. Such bases seem salient given the growing emphasis on practice-based provisions for the initial preparation and on-going professional development of healthcare workers' capacities to be effective in their practice, and responsive to occupational innovations that need to be generated and enacted through practice.

Learning through health care work

As long recognised, experiences in work settings can make distinct contributions to healthcare workers' learning, both in their initial professional preparation and ongoing development across professional working lives(1, 2). Yet, to effectively utilise workplace experiences for these purposes and advance innovation and efficacies in healthcare practice requires the contributions and limitations of these experiences be understood, and used to inform practical actions for their effective utilisation(3, 4). This goal requires drawing on accounts of learning informed, but not constrained, by educational science as much of its assumptions are founded in 'schooling' (i.e. taught experiences in educational institutions).

In addressing these concerns, empirically-based inquiries of learning in workplaces and relevant literature are drawn upon to inform how everyday experiences in healthcare work can be positioned as educationally worthwhile, including addressing future challenges. Whilst not always founded in healthcare occupations, these inquries offer insights that can potentially translate to clinical settings about: i) how learning through those settings arises, ii) the potential and limitations of these learning processes and outcomes, and iii) how learning and innovation can be promoted in and through work. Foundationally, they explain effective learning through healthcare work as arising through a duality between the activities and interactions afforded in clinical settings, on the one hand, and how healthcare workers elect to engage with them, on the other(5). This is the case whether that learning arises through everyday work activities or interventions, such as clinical teaching.

In principle, therefore, there is no difference between accounts of learning through experiences in educational institutions and in clinical settings(6). Both afford experiences and individuals (i.e. students, workers) elect how they engage with what is afforded them. However, qualitatively, clinical settings with their distinctive physical and social environments, activities and interactions afford access to experiences and make contributions aligned with learning healthcare practices. The clues and cues provided by those settings, and their occupationally-authentic goal-directed activities and interactions grant access to and assist securing the kinds of knowledge

required for effective healthcare work and in ways that classroom-based experiences alone cannot(7). There is, however, clear evidence of limitations, shortcomings and risks associated with learning through workplace experiences(7). Hence, these experiences need to be valued in terms of their potential for realising the desired kinds of learning outcomes required for workplace performance that extends to efforts to redress their limitations. Elaborating these qualities and advancing how they can address healthcare workers' learning now and for the future is the central focus here. The increasing role of workplace experiences in both initial occupational and ongoing development in healthcare and the growing requirement for innovation and efficacies in practice makes such understandings particularly important.

Four premises for understanding learning through work

The precepts, practices and focuses of 'schooling' (i.e. those of educational institutions and practices) whilst essential in their own right, currently dominate and can distort considerations of what constitute effective learning experiences. This can lead to the ignoring or downplaying of learning arising outside of intentional educational programs and experiences(6). Therefore, processes supporting learning through work need to be understood on the own premises, which can then inform how they can be best ordered, supported and augmented. Four such premises are now advanced.

Firstly, learning occurs all the time. It is an inevitable consequence of human thinking and acting(8, 9). When practitioners engage in work activities and interactions, more than completing tasks, changes have been shown to arise in what they know, can do and value(i.e. learning) (7). Hence, learning is not reserved for or necessarily privileged by intentional educational experiences. Indeed, rather than where they occur, it is the kinds and qualities of everyday work experiences and individuals' responses to them that shape what is learnt(10). Engaging in clinical tasks or activities that are novel to individuals offer the potential for new learning. Novel experiences, if effectively engaged with and adequately supported, can lead to developing further clinical capacities. However, activities beyond the scope of individuals' existing competence or readiness (i.e. their zone of potential development(11) can lead to limited or negative outcomes: e.g. confusion or frustration(7). Hence, there can be a need for guidance by more experienced co-workers. Importantly, routine or familiar clinical activities can also lead to more effective practice through honing and refining their procedures and establishing causal links and associations of the kind required for clinical reasoning(12). This incremental learning often arises without conscious awareness and can be difficult to recall by practitioners and capture by researchers. So, changes in what individuals know, can do and value (i.e. learning) are ongoing across working lives and are not dependent on educational programs or teacherly interventions.

Secondly, studies indicate that as workers engage in work activities they also remake(13), and potentially, transforming their occupational activities(14). So, as healthcare practitioners enact their clinical work at particular moments in time and circumstances as directed towards specific goals, they are engaged in remaking their occupations, thereby sustaining and, incrementally, transforming them. Sometimes, that remaking extends to the transformation of occupational practice. Worldwide, healthcare workers are currently changing their infection control practices to contain the Ebola virus. As existing protocols have failed, new procedures are developed, trialled and enacted, thereby transforming healthcare practice. So, more than changes arising in individuals (i.e. learning), occupations also change through workers' enactment. Hence, identifying, enacting and

evaluating future clinical procedures and securing innovations are inevitably linked to the co-occurrence of healthcare work and learning.

Thirdly, as clinical knowledge (e.g. that for medicine, radiography, etc.) is a product of history, culture and situational requirements, it has to be accessed and engage with to be secured by workers. Workplace settings have been shown to provide access to aspects of that knowledge through physical and social environments, and activities and interactions that comprise authentic instances of occupations(8). Yet, more than individuals' accessing these experiences, their active engagement with these environments is required for effective learning to arise, including their appraisals of the worth of what is experienced. This engagement arises through everyday thinking and acting through work, and emphasises individuals' learning and development as personally mediated.

Fourthly, learning and development are two separate, but interdependent, processes. Moment-by-moment learning or micro-genetic development continually occurs as individuals learn through their experiencing(15). Yet, this learning is premised on what they already know, can do and value which are legacies of earlier experiences and learning (i.e. their ontogenetic development)(15). So, individuals' personally-particular development means they may learn differently from the 'same' experience(6, 16). Hence, the interlinking between learning and development are person-dependent, by degree. All this suggests that positioning individuals as meaning-makers and constructors of knowledge is central to promoting how learning through clinical practice might best progress and be supported.

From these premises, learning through work is seen as a normal outcome of everyday thinking and acting at work. Factors comprising the social and physical environment, and their activities and interactions shape that learning and its efficacy. Also, the experiences afforded learners and how they engage with them are central to the kinds and extent of knowledge learnt through healthcare work. Having outlined these premises for considering workplaces as learning environments on their own terms, it is necessary to elaborate the particular qualities of learning through work.

Learning through work

Across human history, participating in work activities is the commonest mode of learning occupations (17). Most of it has likely arisen through observation, imitation, practice (i.e. mimesis) and, occasional direct guidance, but only rarely teaching(8). Until relatively recently, this was the only means through which most occupations were learnt. Before the 'era of schooling', that arose with the formation of modern nation states and industrialisation, very few occupations (e.g. medicine) had educational provisions. Yet, even those occupations relied on practice-based experiences. Indeed, in Hellenic Greece, anatomy classes and textbooks were introduced in medical education to compensate for lack of student access to authentic medical experiences (17). Processes of observation and imitation are central to much learning across individuals' lives, including that at work, which largely proceeds without being taught or guided(18, 19). Such claims may seem contentious to those living in schooled societies where educational provisions are ubiquitous and orthodox. Yet, Jordan(19) notes teaching has always been a minor mode of knowledge acquisition in human history. She advises,

> … the didactic mode of teaching and learning has come to prevail in our schools to such an extent that is often taken for granted as the most natural, … most efficacious and

> efficient way of going about teaching and learning. This view is held despite the many instances in our own culture of learning through observation and imitation." (19) (932)

Therefore, given its significance to healthcare work and workers across human history(4), the characteristics and contributions of these experiences are worthy of a brief elaboration.

Using observations, interviews and recall through critical incidents and across a range of industries, studies of how workers' learn through and for their work have identified four key contributing factors to that learning(7). Firstly, through workers engagement in goal-directed work activities and interactions – 'just doing it' – procedural, conceptual and dispositional knowledge is learnt. Engagement in work activities requires individuals to utilise what they know, can do and value and through completing those activities these can change. Secondly, workplaces' social and physical environments afforded clues and cues about performing and learning those activities. Across a range of occupations, workers consisted reported the importance of observation and hearing others as being salient for their learning. This 'indirect' guidance was found to generate goal states (i.e. what needs to be achieved) that guide and permit monitoring of work and learning processes. Thirdly, work activities afford opportunities for practise thereby honing abilities to enact tasks effectively and building causal and propositional links amongst concepts of the kind required for tasks such as clinical reasoning(12). Fourthly, close guidance by more experienced workers assists in accessing and securing knowledge that is difficult to learn and would not be best learnt through trial and error(7).

Noteworthy, three of these four contributions are primarily based on learners' actions, agency and intentions. They emphasise active engagement with what is experienced, including those with more expert workers. An interview based study of medical students in longitudinal rural placements found that their engagement in clinical decision-making through parallel consultations was held to be generative of richer and more applicable medical knowledge than their peers who engaged in more restricted activities in a teaching hospital (20). So, the combination of authentic activities and interactions, interest and focused intentional engagement are held collectively as key contributions to effective workplace learning experiences.

However, potential limitations of learning through work are evident across these studies(7). Workers report a lack of access to required activities and the direct guidance needed for effectively learning occupational knowledge in those settings. When they are not explicit and/or accessible, individuals report difficulty in understanding the goals for their work and learning, and how to achieve some work goals. Also, what is learnt through practice can be inappropriate (i.e. bad, unhelpful, perilous habits or practices). In addition, workers can be reluctant to participate in ways generative of adaptive learning(7). So, in appraising how workplace experiences can assist learning in healthcare settings, measures to redress these potential limitations are required.

Yet, considerations for effectively utilising their potential and redressing limitations needs to go beyond the orthodoxies and conceptions of educational programs, their assumptions and practices (i.e. teaching) and discourse, can be constraining and unhelpful. Much of the strategic and specific procedures required for work are not expressible or captured by the declarative (i.e. stateable) forms of knowledge privileged in those institutions. Embodied ways of knowing (i.e. such as in auscultation (21), are also not accommodated by such forms, nor is haptic engagement (i.e. feel, tactile competence) that is essential to some healthcare diagnoses and treatments. With its reliance upon declarative forms, this discourse also struggles to accommodate dispositions (i.e. values, interest, intentionality) – ethical conduct, for instance. The educational discourse also

emphasises didactic teaching (19) thereby limiting its relevance to learning through work. This critique of the educational discourse is, however, not intended to diminish the essential contributions of educational provisions, teachers' work or experiences in educational institutions. Instead, the concern here is for workplace learning experiences to be appraised in their own terms and not on bases privileged in the educational discourse. Such a platform permits fresh appraisals about how these learning experiences can be utilised effectively, optimised and augmented, as advanced below.

Learning for healthcare work: practice curriculum, pedagogies and personal epistemologies

Following these premises, it is important to understand how workplace experiences can be effectively utilised and augmented. The practical inquiries and literature about learning through work, offer three key bases for making healthcare workplaces effective learning environments. These are seen as translatable to how healthcare practitioners and workplaces can support learning in, through and for healthcare work. These are: i) practice curriculum - the kinds, ordering and sequencing of experiences required to learn healthcare knowledge; ii) practice pedagogies– activities and interactions that augment learning in healthcare settings and iii) individuals' epistemological practices (i.e. what individuals know, can do and value) that shape how they engage in construing and constructing knowledge. Each is now discussed in turn.

Practice curriculum

The origins of word curriculum mean the 'course to follow' or 'track to progress along' (22). Analogously, there are pathways of work activities along which individuals progress to learn the occupational capacities required for effective work. Anthropological studies focussing on such experiences report that much learning for occupations arises through immersion in the everyday enactment of occupations (18, 19, 23). Lave's account of tailoring apprenticeship (14), identifies a pathway of experiences that engaged novices incrementally in opportunities to observe the required work performance (i.e. goals for learning), then activities that progressively provided experiences to learn and refine the capacities required to perform work tasks. Yet, to promote learning that might or will not be encountered through existing work experiences these studies indicate, there can be the deliberate structuring of experiences or the provision of experiences elsewhere (18, 24). The practice curriculum, therefore, comprises the ordering of access to experiences in work settings to progressively secure the capacities to practice effectively. Such pathways are often premised on first engaging novices in tasks where the consequences of making mistakes are low, and progressing to those were the consequences of errors are greater (14, 20, 24, 25).

These experiences can be deliberately ordered, as noted. A study of midwifery students indicated that, of their two kinds of practicums, initial engagement in continuity of care experiences provided understandings about birthing processes from the birthing mothers' perspective, and for students to know issues these women face and their concerns (25). That is, through vicariously experiencing the entire birthing process, these midwifery students came to understand its specific phases and totality, prior to engaging in clinical placements. Through possessing these insights, students are more ready to engage in clinical placements and enacting procedures (e.g. examinations) in ways considerate of birthing mothers' concerns. So, this sequencing intentionally aims to generate understandings and goal states before focussing on developing the capacities for assessing birthing mothers and their babies' health and procedures including delivering babies.

Hence, as with the example of parallel consulting raised earlier(20), this sequencing seeks to progressively secure what midwifery students need to know, do and value through practice.

These curriculum principles offer guidance in how to order and organise everyday work activities in securing effective learning outcomes.

Practice pedagogies

Practice pedagogies are activities or interactions that enrich or augment workplace learning experiences. They can make accessible the knowledge required to be learnt that otherwise might not occur, including assisting with developing procedural capacities and conceptual understanding required for clinical work. So, they can intentionally build capacities and making links and associations required for deep understandings about the occupation(12). These pedagogies may be distinct from those used in classrooms. They can comprise experts' story-telling and verbalisation (i.e. thinking aloud) when performing work tasks(17), thereby making accessible to less experienced observers their thinking and acting. There is also engagement in pedagogically–rich work tasks (i.e. those with potential to support particular learning) (26), direct instruction and 'hands on' assistance by more experienced partners, in the use of specific medical procedures. Then, there is the use of mnemonics for remembering patient conditions or diagnoses of heart conditions (21, 24, 27) and half-finished jobs and artefacts that provide models for work performance(17). For instance, nurses' handovers can be pedagogically-rich activities. Participating in discussions during those handovers about: i) patients, ii) their condition(s), iii) treatment(s), iv) responses to treatment(s) and v) prognoses, thereby providing opportunities for practitioners at different points of development to participate and learn further what they know, can do and value. That learning can range from junior nurses or students understanding patients' conditions, through to participants being informed about and securing nuanced understandings through discussions about prognosis by experienced nurses. These daily work activities can assist nurses understand the complex of factors associated with patient's conditions, treatments and progress. Doctors' morbidity and mortality meetings offer similar experiences and potential outcomes. Whilst healthcare practitioners may see these kinds of activities as being routine, their learning potential will only be realised through effortful engagement by participants.

So, when carefully considered and enacted, these kinds of pedagogic practices can assist strengthen the learning potential of everyday work activities in healthcare settings.

Personal epistemological practices

Beyond experiences afforded individuals is how they elect to engage with them. This is the case regardless of whether it is an experience in the classroom, through clinical teaching, work as a junior staff member, during clinical placements or in everyday healthcare practice(3). Across working lives, seemingly, most learning arises through individuals' active engagement in their everyday thinking and acting: it is personally mediated. We constantly engage in mimetic learning (i.e. observation, imitation and rehearsal) in our work activities (17). It is central to the original concept and practice of apprenticeship wherein learners have to apprehend (i.e. seize) (28), or 'steal' (29) the occupational knowledge to be learnt. Indeed, the Japanese word for apprentice is *minarai*: one who learns by observation with and the term *minarai kyooiku* referring to learning through unobtrusive observation (30). This engagement is founded on personal interest and intentionality which guides the nature and direction of individuals' thinking and acting, and emphasises learners' readiness (i.e. them having the interest and capacities to engage effectively in active learning) (18). Indeed,

individuals have to want and exercise their agency effortfully to engage actively, including deliberately seeking to improve performance (24, 31). All of this is premised on individuals' personal epistemologies (i.e. what individuals know, can do and value). This learning process is not just self-directed efforts, it comprises interdependent learning: engaging with social partners, objects, artefacts, and actively looking for and drawing on clues and cues from the social and physical environment of workplaces and then monitoring progress during task completion.

To exemplify how practice curriculum and pedagogies and personal epistemologies might come together, the experiences of Sue (a third year medical student on a longitudinal rural placement) are illustrative (20). Her placement was located in a rural general practice and included, engagements at the local hospital. She initially observed and worked alongside the general practitioner, by sitting in on consultations, and, incrementally, being more involved in them. After six weeks of this, and with patients' consent she engaged in parallel consultations, with history-taking, examinations and arriving at diagnoses that were subsequently checked by the doctor. So, she engaged in and rehearsed authentic medical activities and interactions, and developed understandings, dispositions and procedural capacities that were judged as being far more advanced than those of her peers. Their activities in a major metropolitan teaching hospital were reported as being less engaged, and occurring through substitute activities and not in actual clinical decision-making. So, the kinds and sequencing of Sue's experiences (i.e. practice curriculum) and the rich support (i.e. practice pedagogies) assisted her learn through these authentic medical activities. Sue's personal epistemology also played a key role. Beyond participating in those activities, she also engaged with the local community (i.e. joined the local church and tennis club) and acted proactively in her learning. For instance, she learnt how to take bloods effectively by modelling how she had learnt in the general practice. Having identified the nurse who regularly performed this role at the hospital, she first observed this nurse taking bloods, and then proceeded to imitate and practice under guidance taking bloods with patients and engaged in a sufficient numbers of these procedures to refine and hone them. Together, this vignette provides an example of practice curriculum (i.e. the availability and sequencing of experiences), pedagogies (e.g. provisions of parallel consulting, being able to observe and practice) and personal epistemologies at play (e.g. her active engagement in the community, surgery and hospital), thereby illustrating how their learning through can effectively progress.

Beyond translation

This brief article aims to translate concepts and findings from other fields to understand and promote learning in health care settings. Yet, as Yardely, Teunissen and Dornan state(4), few such translations are easy or straightforward and this case is no exception. Hence, to support that translation, three considerations are advanced here for future research, deliberations and enactments, the: i) applicability of these findings; ii) knowledge to be learnt and their alignments with experiences promoting that learning; and iii) importance of practitioner engagement. Firstly, the ideas outlined above in drawing upon historical and anthropological accounts, sometimes refer to situations distinct from those in contemporary healthcare workplaces. Hence, the kinds of curriculum and pedagogic practices above emerged from particular work demands and contexts, and their applicability to and efficacy in contemporary and future healthcare practices needs to be appraised. Therefore, more grounded and situated empirical enquiries such as those already conducted(3, 16, 32) are required to appraise the effectiveness, including that associated with promoting and realising innovation in clinical practice settings. Secondly, a clear and growing

distinction is between the kinds of knowledge required earlier, and those needed for the present and future, is conceptual and symbolic work-related knowledge, particularly when associated with technology use has grown. Similar concerns are raised about the development of appropriate dispositions (i.e. values, attitudes and intentions). The literature on conceptual development, in particular, points to the inherent difficulty of developing these forms of knowledge, as they are opaque and not always easy to access. Consequently, further work is likely to be required to understand, in greater depth, what kind of experiences in work settings are generative of these kinds of knowledge related to healthcare work. Specifically, those curriculum and pedagogic practices that can promote conceptual and dispositional knowledge through work activities are likely to be important, particularly when that includes promoting learners' personal epistemologies. It is clear from so many instances of practice (e.g. hand washing) that understanding alone and knowledge of procedures is insufficient. Instead, it is how individuals exercise dispositions in engaging in procedurally appropriate ways and exercise effort in securing knowledge that is difficult to learn. Thirdly, given that much of what is proposed is about learning, efforts to promote effective engagement and learning by healthcare practitioners becomes a key priority. This promotion needs to address not only worker reluctance, but also having pedagogic and curriculum practices that are able to be used nor all experienced practitioners willing to make the effort to use them. Hence, identifying ways in which such support can be exercised within everyday work activities are likely to be central to t the heir efficacy. As noted, some everyday work activities have been identified as being potentially pedagogic rich (e.g. handovers, morbidity and mortality meetings). Yet, unless individuals view them as such and engage with them effortfully and intentionally, the potential of these experiences will not be fully realised. Hence, intentional efforts to prepare and engage health care practitioners in utilising these experiences more optimally.

Conclusions

Experiences in healthcare work settings offer bases for the learning of occupational capacities in ways that are purposeful now and for the future(16, 32). Yet, given the orthodoxies of school societies and privileged status of educational discourses, there is a need to understand workplaces as important learning environments in their own right(4). Like other environments, such as educational settings, they make important contributions to learning the capacities required for effective work practice, but also have potential limitations. So, curriculum and pedagogic practices are required that can be enacted to promote the potential of workplaces as learning environments and which occur in ways that are distinct from those enacted in educational institutions. In addition, particular emphases have been given to learners' personal epistemologies and how these are ultimately central to the quality of practice experiences and their outcomes. Together, these three elements are held as important foundations to understand and secure rich learning experiences that can assist in sustaining and improving the quality of patient care now and in the future.

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