



LEARNING OCCUPATIONS THROUGH PRACTICE: CURRICULUM, PEDAGOGY AND EPISTEMOLOGY OF PRACTICE

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This handout provides information and guidance about how people learn their occupational capacities through work and how that learning can be supported. In all, it:

- draws on studies and literature from a range of disciplines to offer informed and practical advice about this mode of learning for educators and those in workplaces;
- aims to advise how workplace learning experiences can be effectively utilised; and
- seeks to make the learning potential of these experiences better understood and accepted as important and legitimate how both the initial and ongoing learning of occupational capacities can occur and be supported.

WHY CONSIDER WORKPLACE LEARNING EXPERIENCES?

Learning through practice (i.e. work) has long served the initial and ongoing learning of occupational capacities.

The most common form of learning occupations across human history is through practice.

For most people, it was and, for many, remains the main means of learning their occupational capacities.

Work activities and interactions provide much of the experiences required to initially learn and develop further occupational capacities.

How those experiences are organised, made accessible, supported and engaged with shapes their effectiveness.

To optimise that learning, the use of practice curriculum, practice pedagogies and individuals effortfully engaging what they know, can do and value are necessary.

THIS HANDOUT PROVIDES:

Premises for considering learning through work

- Categories of knowledge needed for occupational performance
- Definitions of key terms
- Listing of contributions and limitations of workplaces as learning environments
- Description of practice curriculum and practice pedagogies, and role of learners' personal epistemologies
- Tables indicating considerations for practice curriculum, suggestions for practice pedagogies and how learners come to intentionally learn through work.



SOME PREMISES FOR CONSIDERING LEARNING THROUGH PRACTICE ...

There is no separation between participation in work and learning; as individuals engage in work activities and interactions they learn through that engagement.

Through that work and learning, occupational practice is also remade and transformed in response to changing work requirements.

Occupational knowledge is a product of history, culture and situation, and individuals need to access and engage with it to be learnt.

Effective learning of occupational knowledge likely depends upon:

- i) the kinds of work activities and interactions available to individuals, and
- ii) how individuals elect to engage with their work and learning.

So, beyond the provision of work activities and support from others, workers need to engage actively and intentionally in the learning process.

Learning through work or workplace interventions is best understood as comprising:

- affordances of workplaces – its invitational qualities and
- engagement – how individuals elect to engage with what is afforded them (Billett, 2002).

KNOWLEDGE TO BE LEARNT

The knowledge required to be learnt for performance at work comprises the occupation's domain-specific conceptual, procedural and dispositional knowledge and these have:

- canonical (i.e. occupational) and
- situational (e.g. workplace) levels.

Individuals construct this knowledge as personal domains of occupational knowledge.

Domain-specific conceptual knowledge – 'knowing that' (Ryle, 1949) (i.e. occupational concepts, facts, propositions – surface to deep conceptual knowledge) (Glaser, 1989)

Domain-specific procedural knowledge – 'knowing how' (Ryle, 1949) (i.e. how we achieve goals through thinking and acting (both specific - strategic occupational procedures) (Anderson, 1993; Sun, Merrill, & Peterson, 2001)

Dispositional knowledge – 'knowing for' (i.e. values, attitudes) related to occupational and situated instances of practice (Perkins, Jay, & Tishman, 1993), including criticality.

DEFINITIONS

Practice curriculum – the sequence of workplace activities and interactions that provides experiences for effectively learning the requirements for occupational practice.

Practice pedagogies – activities or interactions that can augment or enrich these learning experiences, often enacted by more experienced workers, but include particular work activities and artefacts.

Epistemological practices – how individuals engage in work activities and interactions, and come to construe and construct knowledge (i.e. learn) based on what they know, can do and value.

Pedagogy – the kind of guidance provided to assist others' learning, in the form of teacherly engagements, and information resources, learning support and interactions, including promoting learner agency.

Mimetic learning – the process of observation, imitation and rehearsal, that comprise innate and foundational bases for humans' construal and construction of their experiencing.

Personal epistemologies – how individuals come to construe and construct knowledge from what they experience, based on their interests, intentionalities (i.e. how they direct their energies and interest) and subjectivities (i.e. sense of selves), their understandings and procedural abilities that shape the process of experiencing and learning.

Zone of potential development – the scope of individuals' learning achievable through their capacities, energies and agency (i.e. personal epistemologies) and beyond which require close (i.e. proximal) guidance to extend that learning



LEARNING THROUGH WORK

Contributions to learning through everyday occupational practice identified in studies across diverse workplaces and occupations include:

i) *engagement in work tasks* (“just doing it”) – outcome of engaging in goal-directed work activities and interactions;

ii) *indirect guidance provided by the setting* (“just being there”) – observation and imitation of co-workers, experts, artefacts and physical and social environment;

iii) *practice within that setting* – practise leads to rehearsal, refinement of procedures and building conceptual associations; and

iv) *close guidance* (proximal) by other practitioners and experts – assists in developing knowledge that cannot be learnt through discovery alone (Billett, 2001).

The limitations of learning through everyday work activities were found to include:

- learning that is inappropriate (i.e. bad, unhelpful knowledge and perilous ways of doing things);
- lack of workers access to work activities and workplace guidance;
- workers not understanding the goals for performing tasks;
- reluctance of experienced co-workers/experts/supervisors to provide guidance to workers;
- absence of expert guidance in the workplace; and
- reluctance of workers to participate effortfully in learning (Billett, 2001).

So, there is a need to draw upon the contributions and redress the limitations listed above.

SUPPORTING LEARNING THROUGH WORK

Supporting learning through work and work practice can be provided through a consideration of: practice curriculum; practice pedagogies and personal epistemologies.

Practice curriculum

Learning through work is perhaps best realised through a combination of access to and engagement in workplace activities and interactions, and in an appropriately sequenced way, and, where necessary, support and guidance to learn the knowledge required for work. The practice curriculum has two elements.

1. Immersion in work activities and interactions – learning through engaging in the lived experiences in a work community (Bunn, 1999; Jordan, 1989; Lave, 1990; Rogoff, 1990)

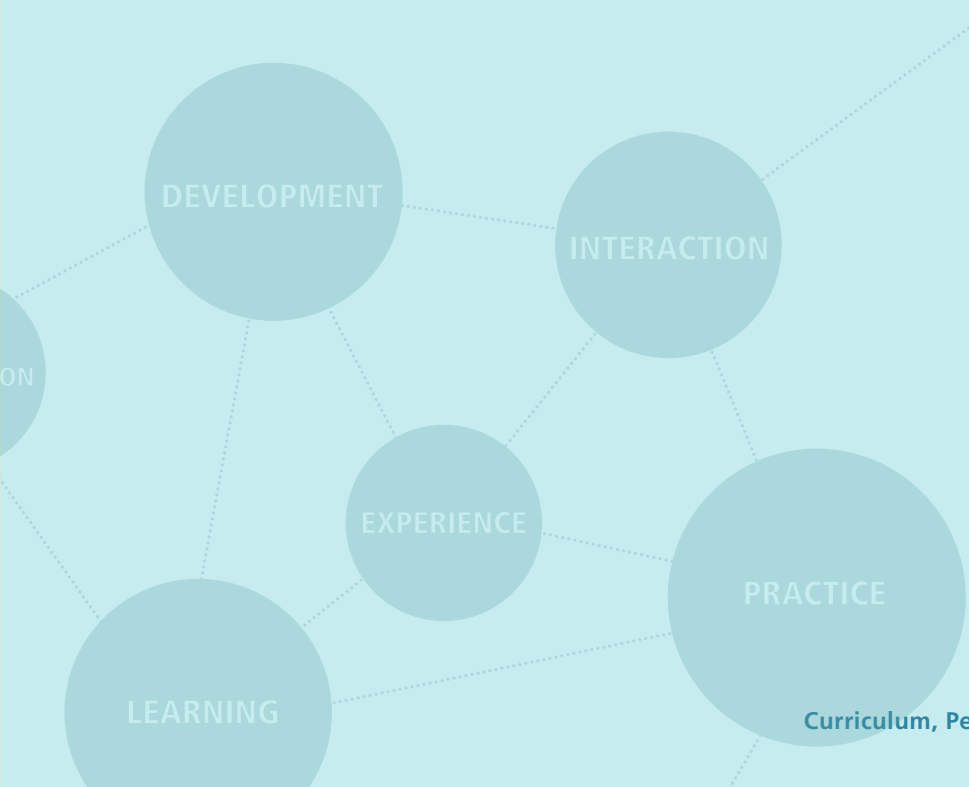
2. Deliberate structuring of learning experiences to organise and sequence experiences that provide access to the occupational knowledge and assist individuals learn that knowledge.

Ordering of experiences

The term curriculum refers to ‘a track to progress along’ or ‘course to follow’. In workplaces, this pathway is accessed through sequencing of the workplace curriculum (Billett, 2006)

Sequencing of activities - from those of low error risk to where consequences of errors are greater as with tailors (Lave, 1990), hairdressers (Billett, 2001), production workers (Billett, 2002), doctors (Sinclair, 1997) and potters (Singleton, 1989).

See Table 1 for more details about these curriculum practices





PRACTICE PEDAGOGIES

Practice pedagogies are those that can promote learning in and through workplace activities and interactions, such as follows.

- Story telling (Jordan, 1989)
- Verbalisation (Gowlland, 2012)
- Pedagogically-rich activities (Billett, Sweet, & Glover, 2013)
- Guided learning/proximal guidance (Billett, 2000; Rogoff, 1995)
- Direct instruction and 'hands on' guidance (Gowlland, 2012; Makovichy, 2010; Singleton, 1989)
- Indirect/distal guidance (Billett, 2001; Gowlland, 2012; Jordan, 1989; Singleton, 1989)
- Heuristics (Billett, 1997) and mnemonics (Rice, 2010; Sinclair, 1997)
- Partially worked examples (Makovichy, 2010)

Also, there are particular pedagogic practices associated with the development of particular kinds of knowledge.

Procedural development can be promoted through: Modelling, Coaching and Scaffolding (Collins, Brown, & Newman, 1989)

Conceptual development can be promoted through: Questioning, Diagrams and Explanations (Billett, 2001)

See Table 2 for more details about these practice pedagogies

EPISTEMOLOGICAL PRACTICES

The epistemological practices individuals adopt and use to learn effectively through their work include those identified as follows.

- Imitation (Gardner, 2004; Jordan, 1989)
- Processes of observation (Singleton, 1989)
- Mimetic learning (Billett, 2014)
- Ontogenetic ritualisation (Tomasello, 2004)
- Active engagement with and apprehending knowledge (Marchand, 2008; Webb, 1999) the knowledge to be learnt
- Learner readiness (Bunn, 1999; Singleton, 1989) and assent (Mishler, 2004)
- Critical engagement (Dewey, 1977)

See Table 3 for more details about these personal learning practices

IMPLICATIONS FOR DEVELOPING OCCUPATIONAL CAPACITIES IN WORKPLACES...

Workplaces are legitimate sites for initial and on-going learning of occupational practice

Like educational settings, they make particular contributions that need to be optimised

Optimising learning through work requires considering and adopting distinct conceptions of curriculum and pedagogies and emphasises personal practices, such as mimetic learning

Identifying how they can assist the learning for particular occupations and specific workplaces is required to be undertaken locally

Important to position workers/ students as being interdependent, not independent learners – whether they are engaging with others, texts, technology or artefacts

TABLE 1: WORKPLACE CURRICULUM PRACTICES – QUALITIES AND ORDERING OF EXPERIENCES FOR EFFECTIVE WORK AND LEARNING

Practice	Description	Purposes	Knowledge
Apprenticeship as a way of life	Engaging individuals in the lived experience of workplaces by participating in their everyday activities and interactions (Jordan 1989, Bunn 1999) to understand the practices and requirements for performance (Makovicky 2010, Lave 1990)	Identifying goals for workplace performance and learning procedural and conceptual knowledge, including honing procedures, forming propositional associations and developing strategic procedures	DP/C; PS/H; CS/D
Ordering of experiences	Providing access to and ordering of experiences required to learn occupational capacities not acquired through everyday work. Might entail skill acquisition in stepwise manner, from those that are easy to learn to more difficult.	Offering a pathway of experiences through which occupational capacities (i.e. conceptual, procedural and disposition of) can be developed.	DP/C; PS/H; CS/D
Learning curriculum	Organising access to work activities from those that have low consequences when errors occur, to those where errors costs are high. Commencing with observations to understand goal states and then progress through activities of increasing demanding work requirements (Lave 1990). In work where all components carry same salience (e.g. midwifery (Jordan, 1989), junior doctors (Sinclair 1997) learning might be acquired in a linear order,	Organising a pathway of experiences whose ordering is based on pedagogic and practice-based considerations, such as increased complexity, error cost.	DP/C; PS/H; CS/D
Learning activities as work conditions permit	Learning staged around workplace imperatives (e.g. learning pottery premised on access to potter's wheel: i) pre-practice observation with apprentice engaged in menial work activities; ii) tentative experiments with wheel, (when not used for productive purposes; iii) assigned regular practice at wheel; iv) assigned production tasks at wheel; and v) a period of work to repay training (Singleton, 1989)	A pathway of experiences based upon access to other workers, equipment, resources that brings together the imperatives of work, workplace and learning	DP/C; PS/H; CS/D
Parallel practice	Individuals engaging in an occupational practice, and being monitored and checked by a more experienced partner at key point in tasks completion (Billett & Sweet 2015). (e.g. doctors – seeing patients, taking histories and conducting examinations, often in parallel to what has been done by a registrar) (Sinclair 1997)	Opportunities to engage in authentic activities whilst being monitored and checked by a qualified practitioner.	PS/H; CS/D

Note: Factual conceptual knowledge (CS); Deep or interlinked conceptual knowledge (CD); Specific procedural knowledge (PS); Strategic or higher order (PH); Personal dispositions (DP) and cultural norms, societal values or sentiments (DC)

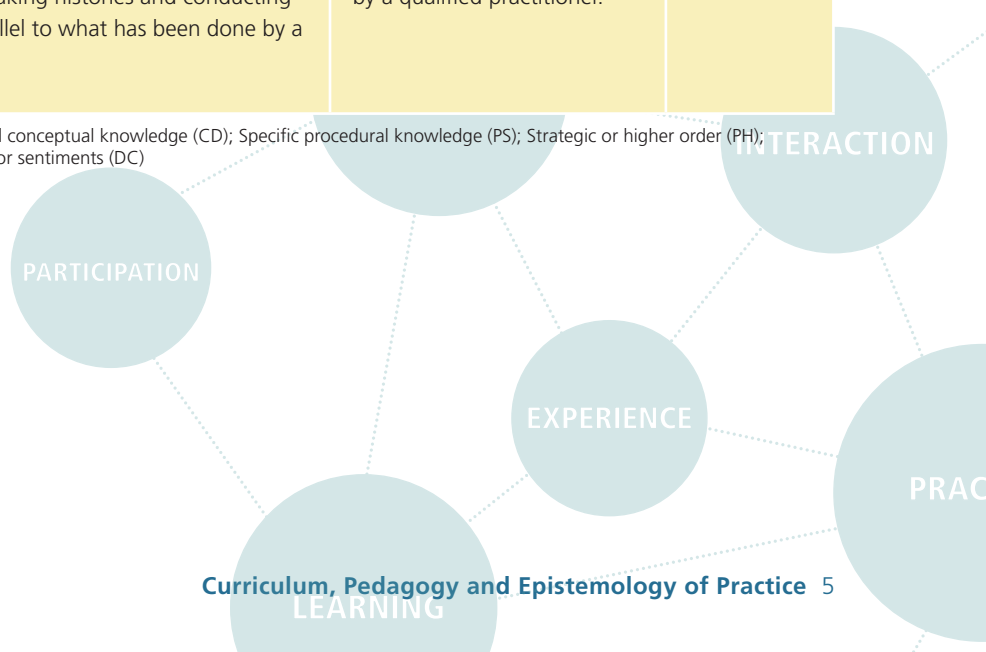


TABLE 2: WORKPLACE PEDAGOGIC PRACTICES – ACTIVITIES AND INTERACTIONS THAT PERMIT PERFORMANCE AND ENRICH LEARNING

Practice	Description	Purposes	Knowledge
Story telling	Telling stories about work events and incidents (Jordan 1989)	Illustrating or capturing concepts or hypothetical formulations to assist in decision-making; legitimate practitioner as expert	DC; PS/H; CS/D
Verbalisation	Talking aloud whilst performing a work task as a form of direct guidance can be linked to 'hands on' engagement (Gowlland 2012)	Explaining thinking and acting being used whilst performing work tasks	DC/DP; CS/D; PH
Pedagogically rich activities	Workplace activities that are inherently pedagogically rich e.g. handovers (Billett 2010) or mortality and morbidity meetings	Developing conceptual and specific and strategic procedural capacities	DP/C; PS/H; CS/D
Guided learning (proximal guidance)	Direct interaction between more and less experienced co-workers, to promote learning in work settings. Use of modelling, demonstrating, guided practise, monitoring progress and gradual withdrawal of direct guidance (Billett 2001, Collins Brown & Newman 1989, Rogoff 1995) , master placing hands on novices' to assist getting the 'feel' of pottery (Gowlland 2012) , guided discovery - placing novices in situations where they can practice, hone skills, and gain experience independently, yet still can have direct guidance (Ingold, 2000)	Extending what individuals can learn through discovery alone, by modelling of activities to be learnt, guidance to assist achieve modelled performance and providing opportunities to refine and hone.	DP/C; PS/H; CS/D
Partially worked example/direct instruction and hands on	Combination of guidance and using a worked example. (e.g. experienced lace-maker producing a small piece of simple lace, showing novice how bobbins are held, and placing hands on novice's to assist learn hand movements to use the bobbins. Also asking novice which bobbin they should use for the next stitch before novice makes movement, leading to confidence in action. Questioning gradually ceased as competence demonstrated (Makovsky 2010)	Provision of models for performance, ability to engage in sub-skills associated with that performance and build understanding about procedural capacities.	PS/H
Heuristics	Tricks of the trade (i.e. procedures that will give you certainty) (Billett 1997)		PS/H
Mnemonics	Developing and using mnemonics (doctors' use of 5 Fs, DANISH to remember about cerebellar lesions) and actual patients ("remember Mr Leeming and you will remember about duodenal ulcers, Freddie Mercury and missed seroconversion) (Sinclair 1997) for procedural efficiency (Rice 2008; 2010)	A means to remember and recall propositions and secure procedural efficacy	PS/H; CS
Artefacts	Artefact or notation system, assists by embedding the knowledge required in a localised context and assists skill and proficiency (Makovsky 2010)	providing clues and cues on how to proceed	PS/H; CS

Note: Factual conceptual knowledge (CS); Deep or interlinked conceptual knowledge (CD); Specific procedural knowledge (PS); Strategic or higher order (PH); Personal dispositions (DP) and cultural norms, societal values or sentiments (DC).

TABLE 3: PERSONAL EPISTEMOLOGICAL PRACTICES – PREMISED ON INDIVIDUALS’ CAPACITIES, AGENCY, INTENTIONALITY AND SENSE OF SELF

Practice	Description	Purposes	Knowledge
Mimetic learning	Ability to imitate and interest to do so at work (Billett 2014). A fundamental process of human learning (Jordan 1989), by imitating implicitly or explicitly what they do (Marchand 2008) including asking questions or listening to more knowledgeable individuals (Gardner 2004), is a higher order activity	Process through which goals, procedures (both specific and strategic), propositional links and associations and can be learnt through personal engagement	DP/C; PS/H; CS/D
Ontogenetic ritualisation	A system of communication and engagement between social partners negotiated through repeated social interactions (Tomasello 2004), supports close guidance and reciprocal interactions in workplaces permitting co-workers to engage learn reciprocally	Basis through which to engage with others from whom guidance is derived.	PS/H; CD
Embodied knowledge	Ability to do rather than talk about it arising through practice (Jordan 1989), renders unconscious much of what is required for performance (claims over 90% rendered non-declarative) (Reber 1992, Lakoff & Johnson 1999)	Procedural learning derived through practice and rehearsal that becomes able to be applied without conscious recall.	DP; CS; PS/H
Deliberate practice	Practising skills and monitoring its improvement (Gardner 2004), as the means by which agency, focussed intentionality and the act of rehearsal come together to secure effective performance (Anderson 2006)	Process of rehearsal, holy, refinement, monitoring of personal performance and conscious efforts to improve the performance	DP; CS; PS
Guided re-discover	Novices engaging in situations where they can practise, hone skills, and gain experience by themselves, yet can still access direct guidance (Makovichy 2010, Ingold 2000)	Process of remaking knowledge through opportunities for observation, listening and other forms of social engagement and practice	DC; PS/H; CS/D
Active engagement & construction	Importance of active engagement (i.e. observation, listening and mimesis). Apprenticeship means apprehendere (i.e. to seize, lay hold of, apprehend, and apprise with the mind (i.e. to inform, give form: to shape (Webb 1999)	Through participating in goal directed activities, learning arises through seeking out, actively constructing and appropriating the knowledge able to be accessed.	DC; PS/H; CS/D
Observation	Japanese word for apprentice is ‘minarai’ – one who learns by observation – also unobtrusive observation ‘minarai kyooiku’ - serious learning progresses without didactic instruction Singleton (1989)	Provides access to goals, models for procedures and bases for developing procedural capacities.	DP/C; PS/H; CS/D
Averting gaze	Mediating the external (i.e. immediately social) contributions – actively ignoring erroneous suggestions to secure an immediate goal to effect productive activities (Glenberg et al 1998)	Intentional engagement with what needs to be learnt.	PS; CS
Readiness	The level and qualities of what individuals’ know, can do and	Mediate the capacities for learning as a result of earlier experiences (and learning)	
Assent	Individuals’ willingness to assent to effortful learning (Mishler 2004)	Mediates how individuals engage with external suggestions, supports	DP/C

Note: Factual conceptual knowledge (CS); Deep or interlinked conceptual knowledge (CD); Specific procedural knowledge (PS); Strategic or higher order (PH); Personal dispositions (DP) and cultural norms, societal values or sentiments (DC).

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