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FOP Research Note 1

Future Oriented Pedagogies

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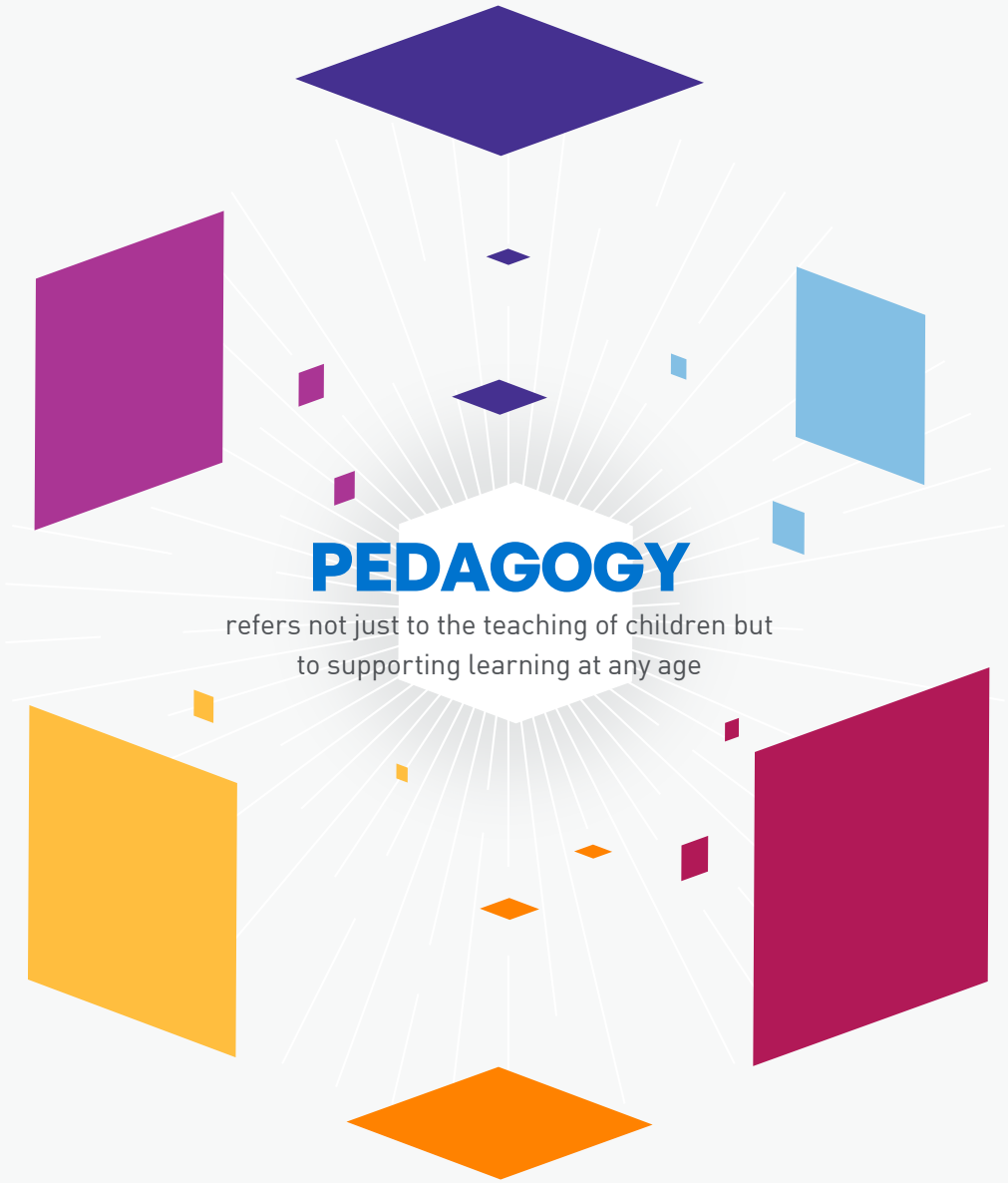
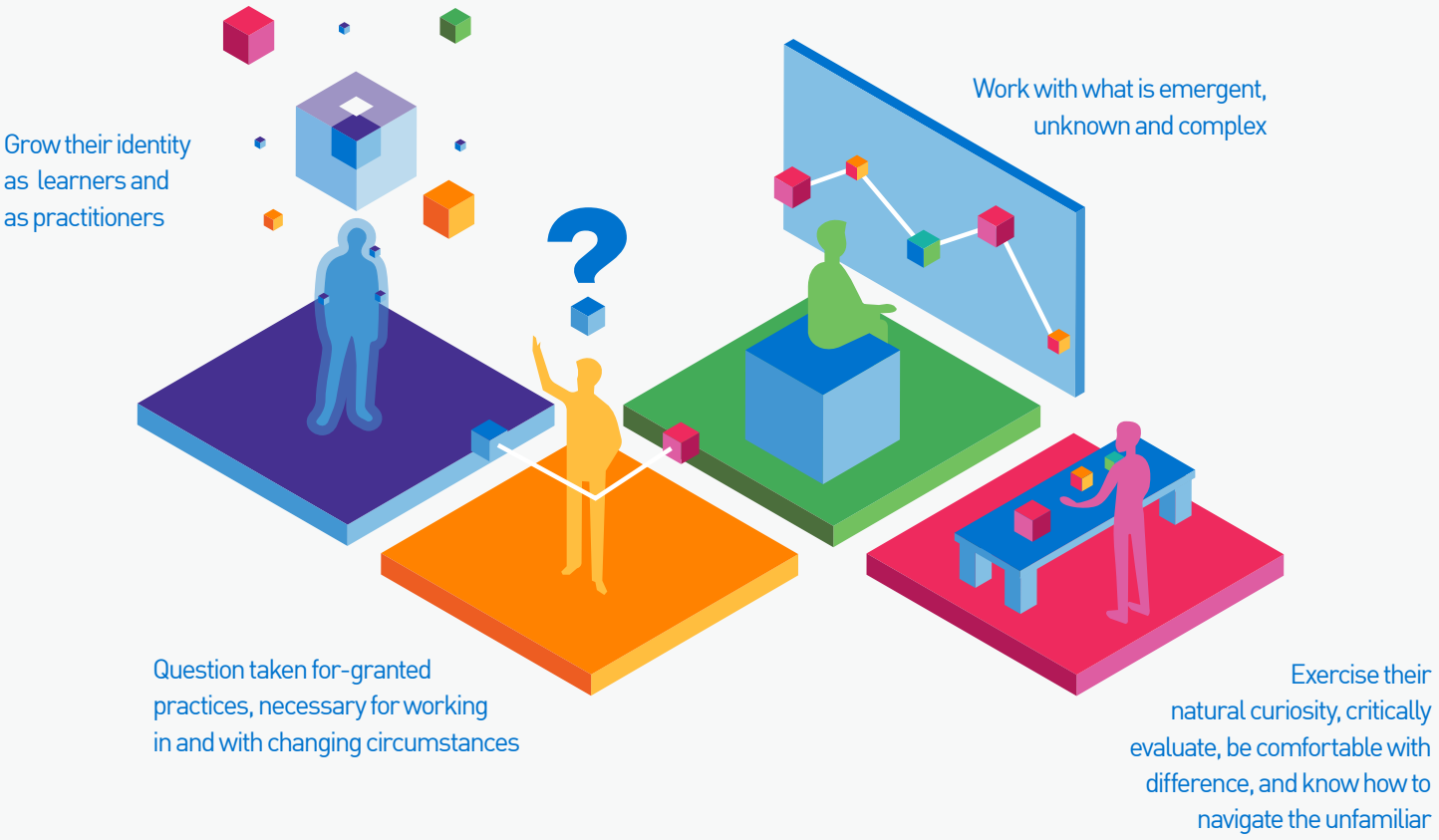
01 Future Oriented Pedagogies



Future Oriented Pedagogies

The research of Bound, Murphy, Chan, Choy and Mohamed (2024) addresses the many calls[1] for a focus on the future of teaching and learning to develop future oriented learners. We have known for sometime that traditional transmissive approaches do little to prepare learners for current and future dynamic change. There is a clear imperative to develop future oriented learners who are able to:



We need to shift from predominantly traditional, transmissive approaches to future oriented approaches. This first research note in this series introduces readers to future oriented pedagogy for future oriented learning based on the IAL research of Bound and colleagues (2024). But first, a little further unpacking of why the need for future oriented pedagogies.

[1] Misko, 2020; Guthrie & Waters, 2022; Wheelahan, Moodie & Doughney, 2022; Kemmis, 2021; Strydom, 2021; Avcı, 2021; UNESCO, 2021

02 Changing Times Demand Changes to Teaching & Learning

Box 1: Current pedagogical practices in Singapore

Our research showed, as would be expected, that there is a variety of pedagogical approaches being used in Singapore's CET system.

However, as is the case internationally, the predominant approach is the **traditional transmissive approach.** We call this **Reproducing Knowledge (RK).** Learners are not challenged, rather they are expected to do learning work at the lowest cognitive levels, reproducing this in MCQ questions, oral questions, and scripted role plays. In some cases, we observed there was no variation, no dance across different pedagogical approaches. Rather, for much of the time, the educator talked, shared stories, and asked short-answer questions, often engaging in the Initiation-Response-Feedback (IRF) sequence. The IRF sequence is initiated by the educator who is seeking a correct response from learners, which the educator follows with a form of simple feedback, for example, "Good", or "Correct" [2].

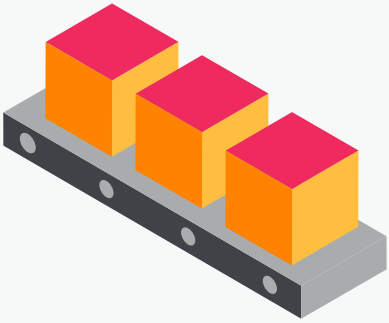
This pattern of interaction "reinforces the educator's authority as the transmitter of received wisdom and severely restricts the possibilities open to students to contribute thoughtfully to... talk"[3]. In other words, discussion is closed down.

Rapid advances in technology, particularly the use of Artificial Intelligence (AI), presents possibilities and risks that are constantly emerging. Product life cycles, production cycles, production and business concepts are becoming shorter. Global threats and risks such as international conflicts, climate change and pandemics all impact on market relations, possibilities and risks, further contributing to challenges for organisations and workers/learners. The emergence of as yet unknown solutions, ideas, ways of working and how we relate to others and things demand different approaches to teaching and learning[4]. Such demands are not just the province of professionals and technicians. Production line workers, for example, need to master variation as product life cycles and process optimization lead to change, breaks, disturbances in quality, and

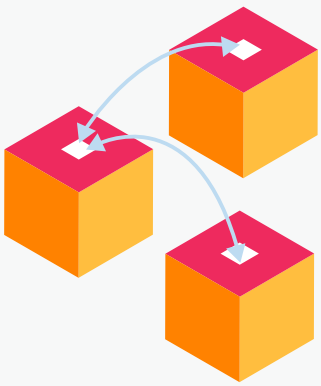
[2] Skidmore, 2006
[3] Ibid, p.
[4] Engeström, 2010

waste issues. Such challenges need individuals and collectives – all those involved up and down the production line and management – to be comfortable with what is emerging, to go beyond what is already known. Working across boundaries of organisational divisions, teams, disciplines, projects, cultures and working environments is the new norm – a norm that needs boundary crossing capabilities. Traditional ways of teaching (be it in classrooms, in the digital world or in workplaces) where content is known ahead of time by educators (anyone who supports learning in any setting) is not enough. The design of new activity and the learning of new capabilities, skills and knowledge are increasingly intertwined[5]. People's ability to generalize, be involved in developing emerging ideas, ways of doing things, products and processes and to learn new (or adjust) capabilities involves more than individuals acquiring knowledge and skills.

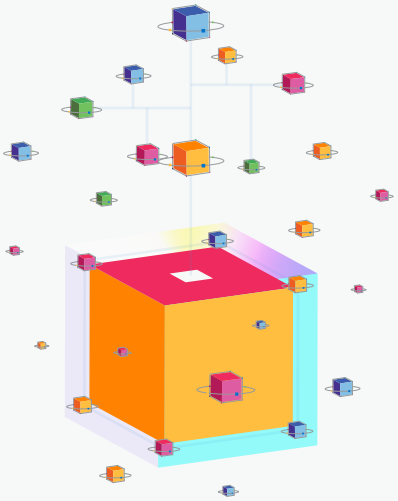
The question is, what pedagogies support these demands?



Reproducing Knowledge (RK)



Distributed Knowing (DK)



Dynamic Generative Knowing (DGK)

[5] Ibid

03 Future Oriented Pedagogies

Box 2: Pedagogy

For many decades now, pedagogy has referred not just to the teaching of children but to supporting learning at any age. We use "pedagogy" to refer to:

- The context (policy, institutional requirements, norms, etc.) of teaching and learning.
- The interactions and relations between educator and learner(s).
- The spaces for learning.
- The intent to support learning.

All of these aspects influence what the educator perceives they can and cannot do (i.e. the agency of the educator).

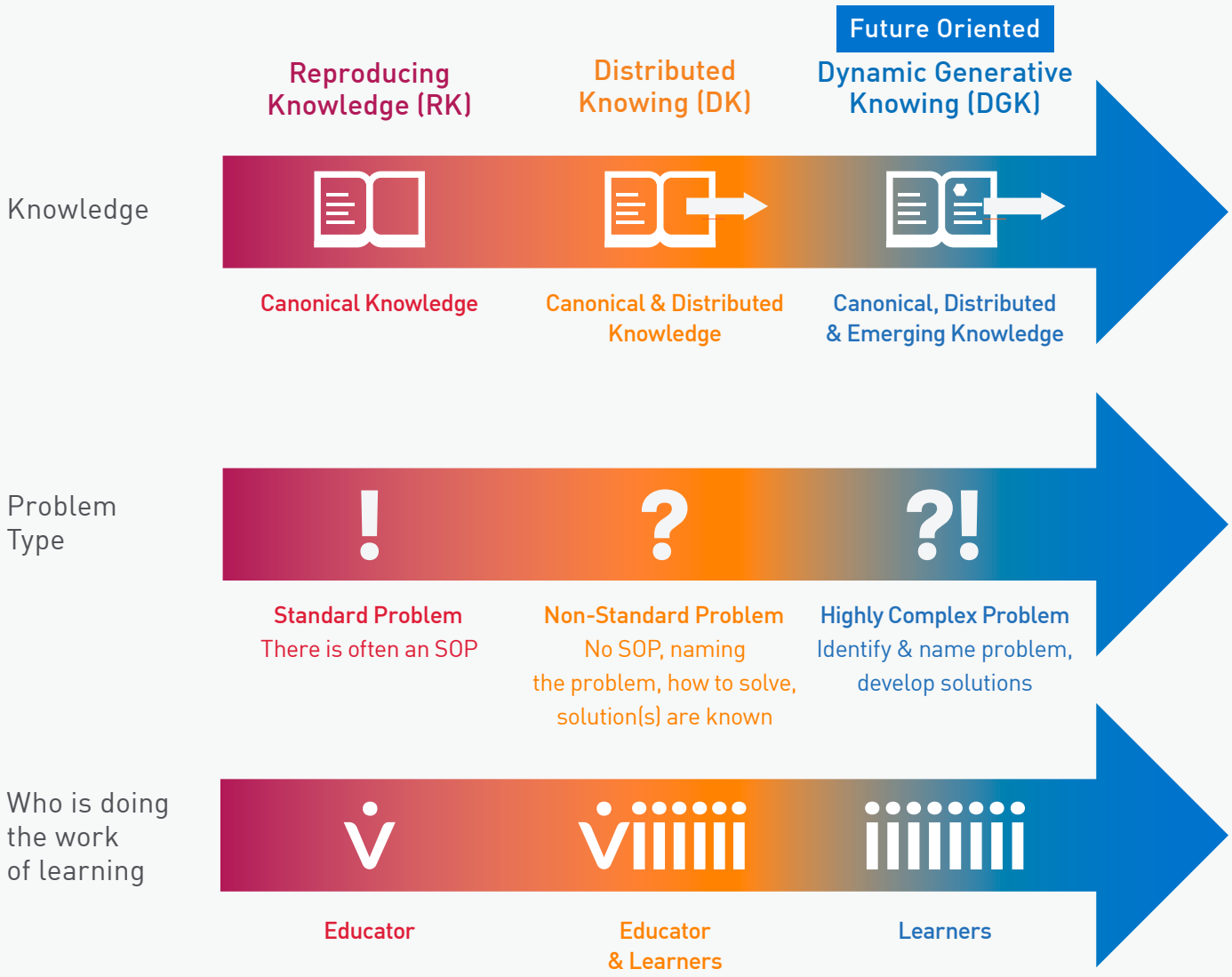
Future Oriented Pedagogies (FOPs) refers to the pedagogical intent and enactment of growing future oriented learners who:

- work with what is emergent, unknown and complex
- question taken for-granted practices, necessary for working in and with changing circumstances
- exercise their natural curiosity, critically evaluate, be comfortable with difference and know how to navigate the unfamiliar
- grow their identity as learners and as practitioners

The focus in future oriented pedagogies is learners - their growth and ability to thrive in changing circumstances. By 'Intent' we mean beliefs and commitment. 'Enactment' is putting beliefs and commitment into practice.

The pedagogical approach that supports the development of future-oriented learners is what Bound et al. (2024) call 'Dynamic Generative Knowing' (DGK). Bound et al. (2024) identified other pedagogical approaches namely, Reproducing Knowledge (RK) and Distributed Knowing (DK). As shown in Figure 1, 'Knowledge' in RK refers to canonical knowledge – knowledge that is accepted as authoritative e.g. principles of lean production, how to get an electric current flowing and why it works. Knowledge in DK refers to knowledge that is distributed across people and things e.g. SoPs, the Internet, norms. As people access this knowledge, their context impacts on how they use and make sense of it. This is an active process, hence the verb, "knowing" in Distributed Knowing (DK). Finally, emerging knowledge in DGK refers to knowledge that is created collectively through addressing issues, problems, tensions and contradictions.

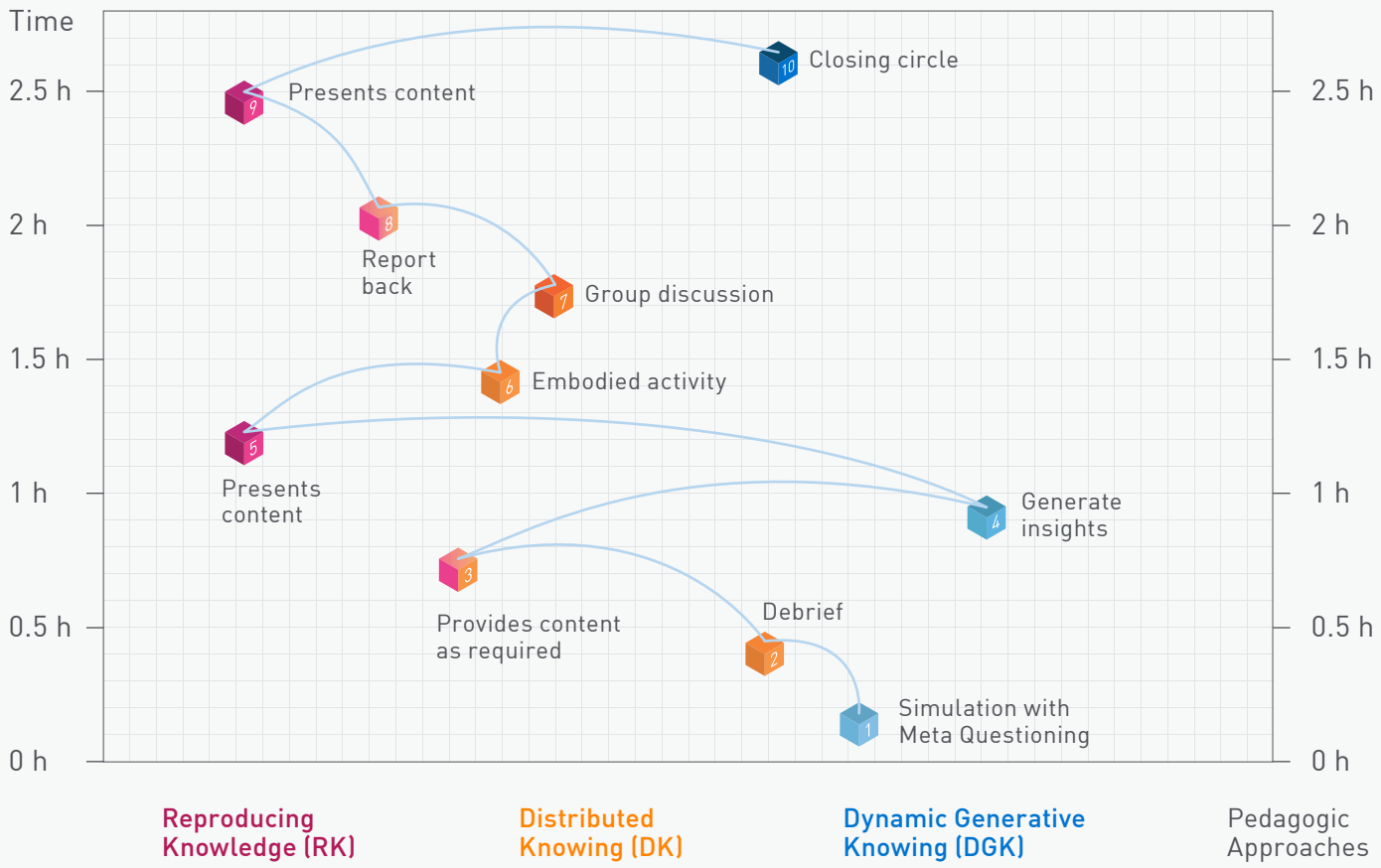
Figure 1



The 'Problem Type' aligns with the types of knowledge. A 'standard problem' is one that can be addressed by canonical knowledge and where there is often a 'Standard Operating Procedure' or 'SOP' that one can take reference from. In contrast, a 'non-standard problem' is one where there is no SOP in place but possible solutions are likely known, or distributed, across various sources. A 'highly complex problem' is one that is ill-defined, difficult and may involve multiple interconnected and conflicting issues.

In 'Who is doing the work of learning', in RK, it is the educator who is doing the strategic work of learning – making sense of content to present to learners, identifying and pointing out what is important. In DK, the educator also does some of this work, but it is shared with learners who are actively making sense of content. In DGK, it is learners doing the work of learning – as it should be, as that is their purpose for learning. The educator is also doing work but has given responsibility to learners to do the work of learning through creating a community of inquiry.

Figure 2: It's all about the dance



Worker-learners at all levels and abilities need to be engaged in learning activities that are future oriented. This means that the DGK pedagogical approach applies to all. Figure 2 shows how DGK can be applied to short courses.

In this leadership course (Figure 2) in the health sector, we see that there is a dance across the three different pedagogic approaches and teaching and learning (T&L) activities that fall in between the three approaches of RK, DK and DGK. Each numbered cube is a different T&L activity against the y axis of time.

Worker-learners from the same hospital in this course had spent the morning in various T&L activities. After lunch they drew lots to determine who would sit at the T (top), M (middle) or B (bottom) table as they entered the room. The T table had a tablecloth, exquisite snacks, crockery and flowers; the M table had a basket of standard snacks and water; and the B people had no table, but did have chairs in a circle and bottles of water. This was a simulation about power and the role of different levels in an organisation. The first task was to discuss how they saw themselves in relation to the other groups, how the other groups saw them and what it all meant for how different groups contribute to change initiatives. The course was a small part of an organisation-wide strategic change process towards holistic patient care. The researchers labelled the questions as 'meta questions' as they went from learners themselves to others, to the whole organisation and the implications of change nationally.

'Meta questions' demand critical thinking, evaluation and consideration of different perspectives – all aspects of inquiry and the pedagogical approach of DGK.

The debrief in Activity 2 was moved a little to the left of DGK as it was largely led by the educators, however, worker-learners were making insights and building new understandings and knowledge through this discussion. Learners building knowledge is another T&L activity learners collectively undertake in DGK. Notice that in Activity 3, 'provides content as required' is between RK and DK. It is placed here because the educator is transmitting knowledge but in small bites in response to participants' probing inquiry questions. This led to deeper insights as the dialogue continued. Note that Activity 5, 'presents content' is RK. The educator used this approach to introduce a new concept. This contrasts with introducing the concept of power and how people see others through a cognitively and emotionally demanding activity such as the simulation. Activity 5 however is followed by a T&L activity (Activity 6) that engages learners and begins to get them thinking about what is known in the system, pooling what is known in the group together, that is, accessing the distributed knowledge in the group, hence this is DK. The group work in Activity 7 was of a different nature to the group work in Activity 1. Activity 7 had learners pooling their knowledge together to make further sense of the concepts introduced in 'presents content' in Activity 5.

Future oriented pedagogies mean that the educator believes that worker-learners are not only natural sense-makers, but when trusted and expected to solve complex issues or work with complex concepts, they will further improve on the ideas as they engage in dialogue, crisscrossing between theory and the practices they engage in or have seen others engage in. Figure 2 shows some examples of different T&L activities that are RK, DK, DGK or somewhere in between.

'Meta questions' demand critical thinking, evaluation and consideration of different perspectives – all aspects of inquiry and DGK.

Group work and questioning are examples of core T&L activities that can be enacted and used for different purposes and outcomes. Questioning, for example, if used in a typical IRF sequence (see Box 1) is a pedagogical approach that is about Reproducing Knowledge (RK). However, when questioning is used to inquire, probe, generate dialogue contributing to worker-learners building knowledge, then this is future oriented Dynamic Generative Knowing (DGK).

04 Redesigning from Reproducing Knowledge (RK) to a Dance Across the Pedagogical Approaches

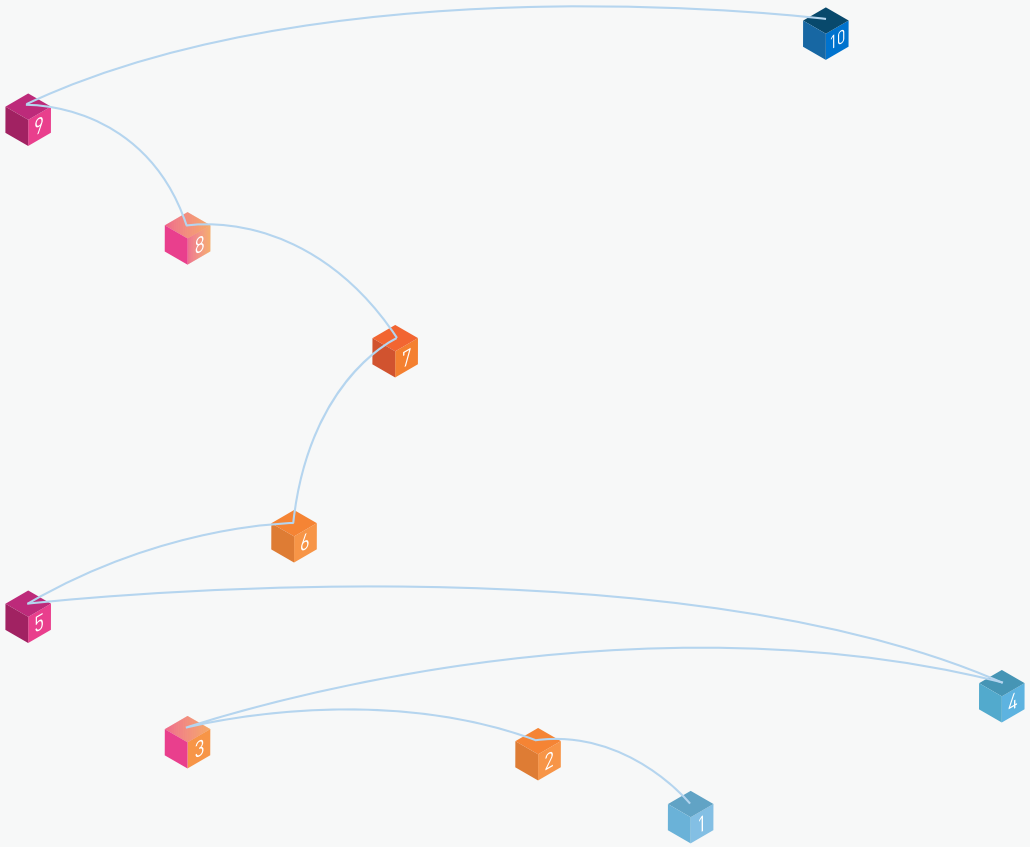


Figure 3 is an activity map of a compulsory hygiene course that all food workers must take. This session took place in a narrow room with learners in rows and a small kitchen for three students off to the side.

In this session learners spent most of the time listening to the educator – activities are clustered around RK. Her material was professionally presented, and included photos. She also used metaphors in her explanations. Such techniques help to elucidate concepts and are an important pedagogical tool for educators. However, aside from Activity 4 where worker-learners were given the opportunity to briefly share their experiences, learners were not actively engaging with the content. Rather, they were expected to memorise what the educator was telling and showing them.

This is an important course and in worst-case scenarios, the content relates to matters of life and death. Food workers need to understand the potential consequences of their actions and the conditions they work in so they can address issues as they evolve. So, how can this course be redesigned so that learners will not only understand but have the confidence to act, and most importantly, to use their agency to address potential issues?

Figure 3: F&B hygiene course

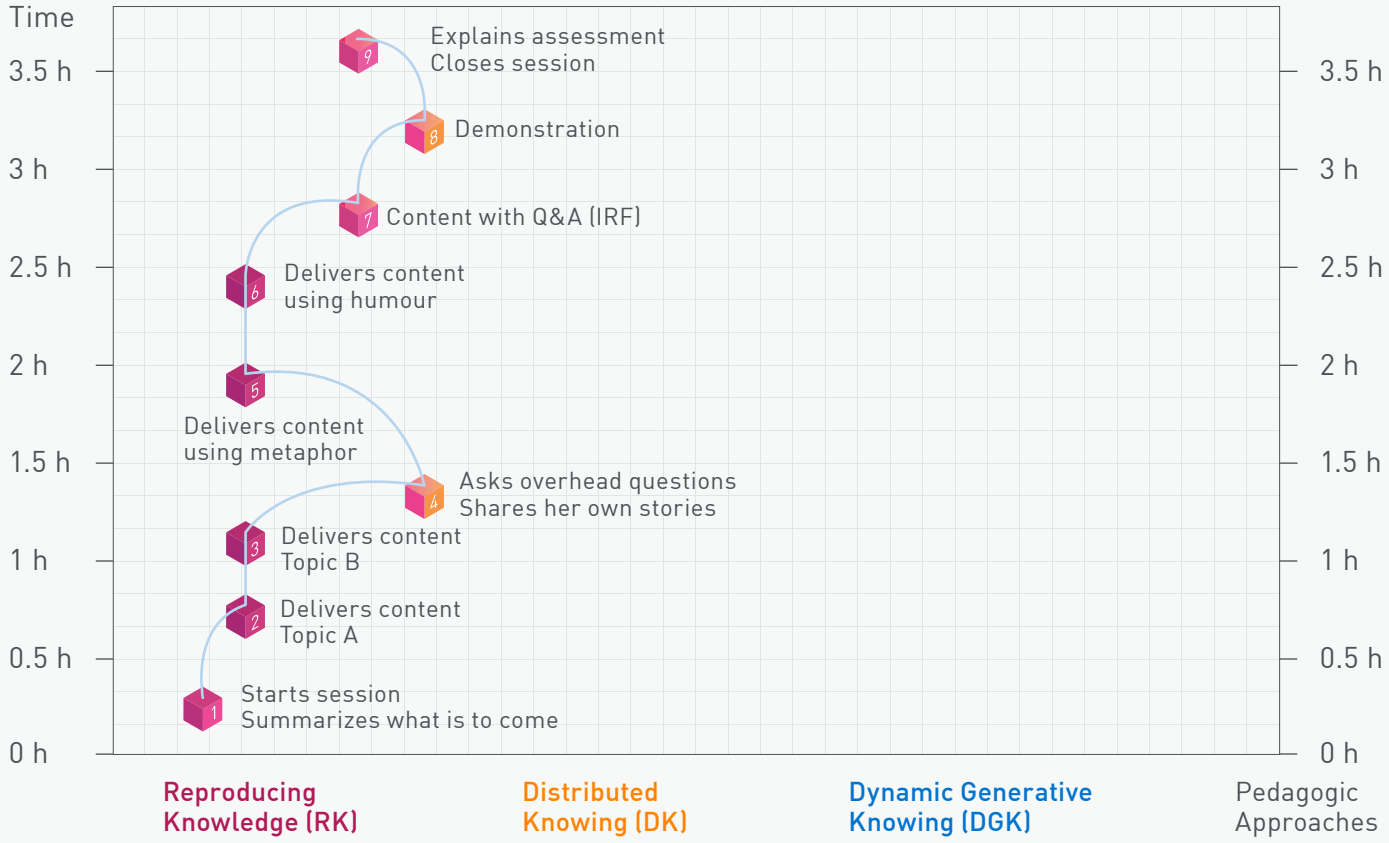
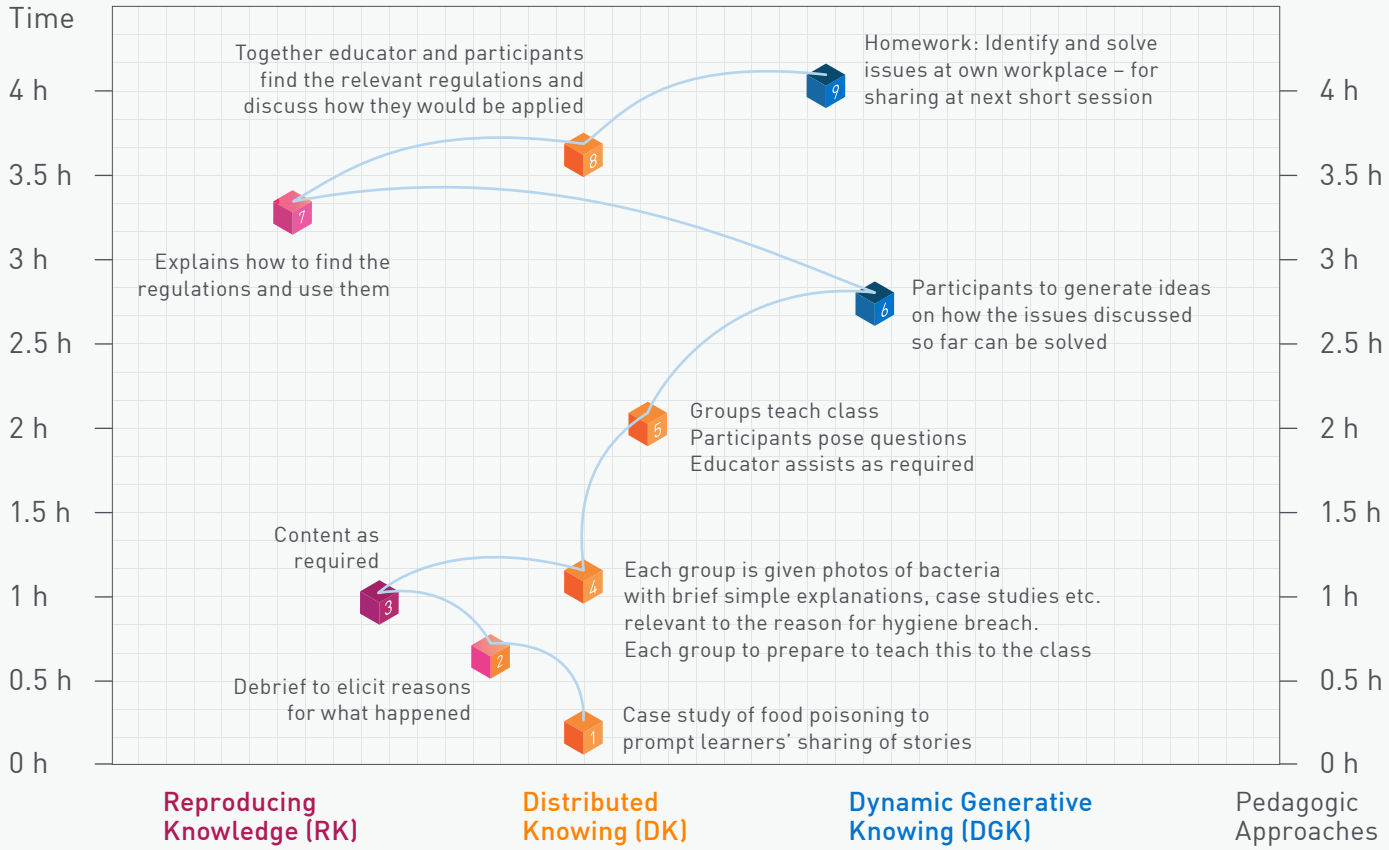


Figure 4: Redesign of F&B hygiene course

This is one of many possible redesigns. How would you redesign the course so that there is a dance across the pedagogic approaches?



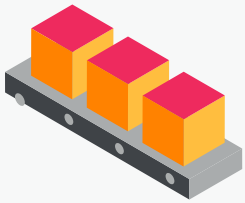
In Figure 4 which illustrates a redesigned F&B hygiene course, there is a strong pedagogic dance engaging the range of pedagogic approaches. Note that the educator starts, not with delivering content, but with a case study (we assume she has explained the day's agenda earlier in the day). Worker-learners are not only actively engaged with the materials and content but are also drawing on their own authentic experiences and knowledge and building knowledge. They are generating insights. Rather than the assessment being an MCQ test, participants could be given 1-2 weeks to observe their own or another workplace, identify hygiene issues and propose solutions.

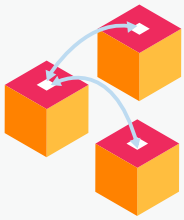
Participants would come back for another half day to share and discuss. The criteria for assessment could include accuracy of knowledge (e.g. regulations, impact on consumer health) as well as the thoroughness of the proposed solution. Each sharing would require learners to provide critique and feedback. The quality of this input would be another criterion as it indicates depth of understanding, breadth of knowledge and the ability to put the knowledge to work. In the interests of inclusion, each group should include those with experience in the sector, and those new to the sector.

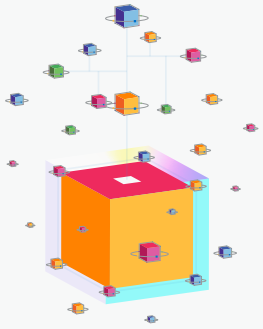
Same activity – different pedagogical approach

Figures 2 and 4 show how group work can be used for the purposes of somewhere between RK/DK, DK or DGK. This is the same for many T&L activities. Table 1 provides another two examples of T&L activities, and how these activities can be used in ways that represent different pedagogical approaches. In other words, we cannot pluck a T&L activity from our tool box and say it is future-oriented. It is necessary to think about the intent and the more generic learning outcomes to determine if the T&L activity is RK, DK or DGK or somewhere in between, as shown in Table 1.

Table 1: Same activity but different pedagogical approach





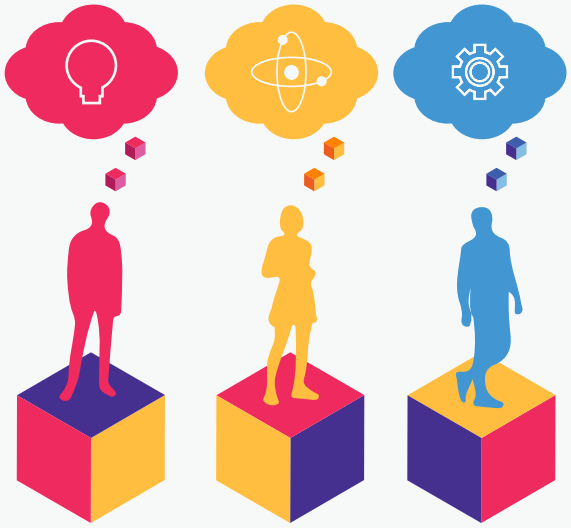


Activity Samples	Reproducing Knowledge (RK)	Distributed Knowing (DK)	Dynamic Generative Knowing (DGK)
Role play	**Scripted role play** Purpose: learners to reproduce required script	**Scenario given** **Learners move into role and try out the skills** Purpose: learners to put their learning to work, build confidence in their abilities	**Learners create:** • Test out possible solution • Refine needed skills etc. Purpose: part of problem solving, evaluate critically, refine, try something different etc.
Case study	**Simple case study** Purpose: help learners repeat content in their own words	**Complex case study** Purpose: develop analytical skills, learn to ask questions, seek to improve current practices	**Highly complex case** Purpose: Introduce new concepts, develop inquiry skills

The future oriented pedagogic framework helps with understanding what is future oriented and what is not, in order to design and facilitate learning, be it in a workplace, classroom or digital environment. The aim is to move towards DGK where possible, so that there is a dance as seen in Figures 2 and 4. The future oriented pedagogic framework is an important tool for understanding the differences between RK, DK and DGK.

05 The Future Oriented Pedagogic Framework

The framework shows the three different pedagogical approaches and four different aspects of pedagogic approaches – see Table 2.

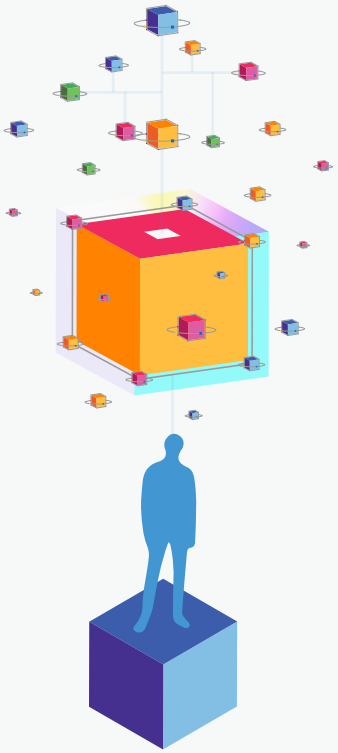


Beliefs

'Beliefs' refer to an educator's, an institution's, an enterprise's, a national system's, beliefs about learning, teaching, knowledge, and learners.

Who is doing the work of learning

'Who is doing the work of learning' refers to relations between educator(s), learners and artefacts (e.g. a case study, a digital game) and who is doing what. For example, who is doing most of the talking, who is contributing expertise, who is asking questions, who is doing the sense-making – these are examples of the work of learning.



Assessment

Assessment is usually considered part of learning design, but we have separated it out because if we give specific attention to assessment, this can be a powerful tool for change. Assessment and learning are intertwined, not separate processes or activities. As with learning design, the Six Principles of Learning Design[6] (authentic, alignment, holistic, feedback, judgement and future-oriented) are used to guide the design of all types of assessment – summative, formative, diagnostic[7] and sustainable assessment[8].

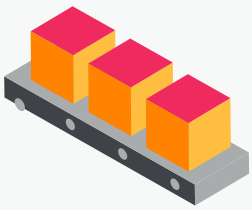
Learning Design

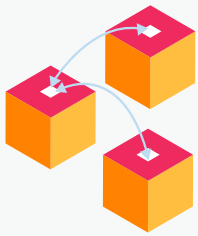
The Six Principles of Learning Design are used to guide the design of the 'dance' along the pedagogical practices continuum, that includes DGK. Learning design refers to learning in any space where learning occurs – workplaces, digital environments, classrooms, laboratories, etc.

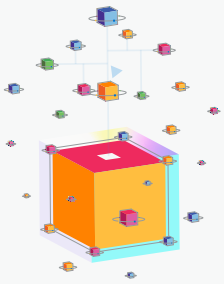
Together, these four aspects are integral to the work of an educator and evident in design, assessment, facilitation, the affordances offered by learning environments, quality assurance, learning systems and national policy. The full framework can be found in Appendix 1.

[6] Bound & Chia, 2020
[7] Darling-Hammond, 2014
[8] Boud, 2000

Table 2: Future Oriented Pedagogic Framework







Aspects of Pedagogic Practices	Reproducing Knowledge (RK)	Distributed Knowing (DK)	Dynamic Generative Knowing (DGK)
Beliefs about teaching, learning, learners and knowledge			
Who is doing the work of learning			
Assessment			
Learning Design			

What's Next?

If you are interested to take part in experimenting and/or co-creating how to move more towards DGK with other stakeholders, please contact: **alc@ial.edu.sg**

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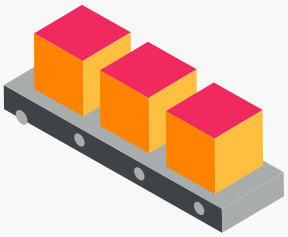
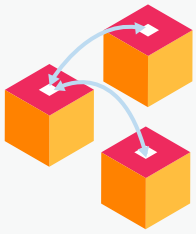
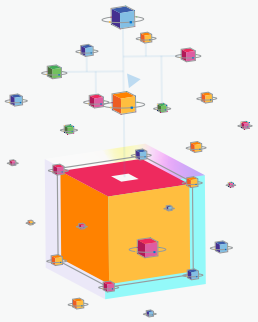
Appendix

Aspects of Pedagogic Practices: Beliefs







Reproducing Knowledge (RK)

Knowledge that is already known, codified and thought of as transferable (canonical knowledge).

Learning is knowledge / skills acquired. Learners individually make sense of what is being imparted, refine and combine concepts to develop rich cognitive structures.

Teaching is typically believed to be giving lectures, providing knowledge, and covering the required content.

Learners are assumed to have limited knowledge relevant to the topic. Some believe learners need to be stepped through the basics first before undertaking more complex learning tasks.

Distributed Knowing (DK)

Knowledge is understood as distributed over and embodied in people, tools and other artefacts and environment.

Knowledge is socially constructed through using it (knowing).

Learning is embodied, involving emotions, social cognition and thus, social activity.

Teaching is about introducing learners to the ways of knowing and practices of relevant communities, involving both canonical and distributed knowledge, ways of being in that community.

A purpose of teaching is to enculturate learners into the accepted practices, ways of understanding and beliefs.

Learners are assumed to be natural sense-makers and motivated when working with their own authentic issues.

Dynamic Generative Knowing (DGK)

Knowledge emerges and is generated in and through dialogue and practice.

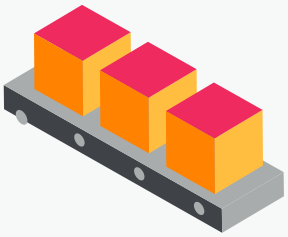
Learners are naturally curious and motivated through working on their own authentic problems.

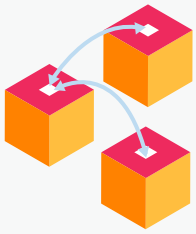
Learning is collective, necessarily involving social cognition enabling learners to make the most of being involved in collective inquiry processes.

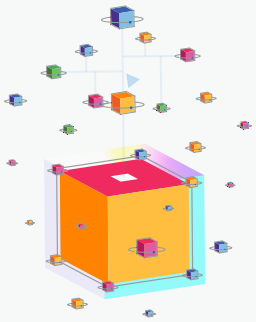
Learning is embodied; involving internal and external cognition in expanding cycles.

A purpose of teaching is to develop learners' ability to thrive in unknown, unexpected circumstances (i.e. to develop future-oriented learners who exercise their own epistemic agency).

Aspects of Pedagogic Practices: Who is doing the work of learning







Reproducing Knowledge (RK)

The role of the educator is to impart knowledge and ensure learners recall it.

The educator does most of the talking as they impart knowledge.

Questions asked by the educator often close down dialogue. For example, the use of Initiation-Response-Feedback / Evaluation (IRF) is common in this pedagogical practice.

The role of learners is to listen and make sense of what they are listening to and seeing.

Learners seek to give correct responses, individually and in group work.

Distributed Knowing (DK)

Together educator and learners develop a community of learning that is a safe space.

Learners are actively engaged.

Learners develop learn to learn skills through becoming aware of how to access knowledge; develop observational skills, and come to know what questions to ask to understand different settings.

Educator is a facilitator and guide, providing access to, delivery of, and opportunities for learners to use canonical knowledge and distributed knowing.

Educator opens up discussion and facilitates deep understanding.

Dynamic Generative Knowing (DGK)

Together, learners and educator(s) build a collective community of dialogic inquiry.

Learners think, feel, and do with curiosity, are naturally motivated as they engage in authentic activities.

Learners take responsibility for their learning, contribute to improving on ideas through asking questions, sharing experiences, capturing dialogue etc. and in the process exercise their agency through taking ownership of their inquiry efforts.

Learners build knowledge, improve on ideas, solve problems of understanding and/or problems that need solutions to be developed and how those solutions will be developed.

Educator shares power and is comfortable with being challenged.

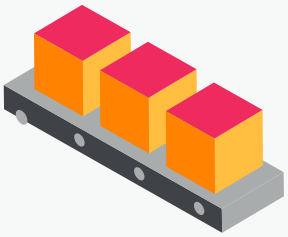
Educator prepares the ground and draws on learners' authentic problems/issues in understanding etc., to trigger inquiry, to provide input, corrections as needed.

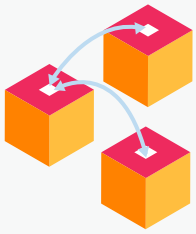
Educator provides scaffolding as required (like a gardener) and supports learners towards being comfortable with the unknown, unexpected challenges, etc.

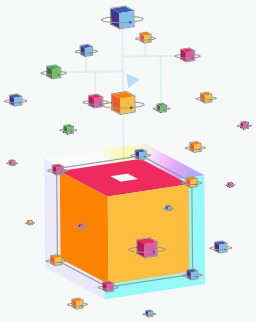
Educator provides access to multiple perspectives, challenges and supports learners to uncover assumptions, engages learners in cognitive, kinaesthetic, emotive experiences, etc.

Educator role is to ensure a safe psychological space; provide opportunities for choice; challenge learners to improve on ideas, consider different perspectives, processes etc.; develop learners' ability to gather/identify relevant data, analyse it to make evidence informed decisions; to provide learners with access to resources and encourage them to access their own resources.

Aspects of Pedagogic Practices: Assessment







Reproducing Knowledge (RK)

Assessment understood as testing what (knowledge) has been learnt.

Assessment tasks require learners to reproduce what has been taught.

Learners are not required to put their learning to work (apply).

There is usually a focus on summative assessment.

Distributed Knowing (DK)

Assessment understood as judgement of holistic performance in which understanding is embedded.

Assessment is entwined with learning, thus multiple forms of assessment are used - assessment for (diagnostic), as (formative), and of (summative) learning.

Assessment activities require learners to put their knowledge to work.

Assessment requires learners to engage at higher cognitive levels as they move iteratively between theory and practice.

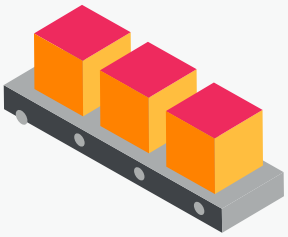
Dynamic Generative Knowing (DGK)

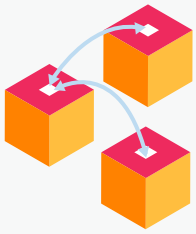
Assessment focuses on feedback and data that contribute to learners improving on ideas, understanding, solutions.

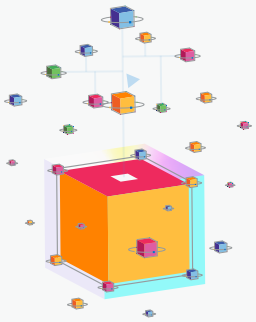
Learners continually evaluate ideas, understandings and solutions of their own and others.

All forms of assessment (for, as, and of) plus sustainable assessment # are included as and when required.

Aspects of Pedagogic Practices: Learning Design







Reproducing Knowledge (RK)

Evidence of 6PoLD is weak; limited use of authentic experiences and data (except for examples or stories provided by the educator). The senses most commonly appealed to are hearing and seeing. Learners are not required to make judgements or give feedback. They have little opportunity to learn how to learn or develop deep understanding through actively engaging with the content.

Focus is on content.

Theory and practice are treated as separate and designed to be taught at different times to each other.

Standard lesson sequencing structures are often used.

Learning design documentation is often expected to be followed with limited or no change.

Distributed Knowing (DK)

All 6PoLD are evident: Materials and activities are based on authentic experiences and data; theory and practice are integrated, as are generic and technical skills, and activities and materials call on multiple senses and emotions (holistic); learners have opportunities to make judgements about their own and others' performance and feedback is given and received from multiple sources. Additionally, feedback loops are built into the learning design. Learning is designed to develop deep understanding and learning to learn skills. All aspects of the learning design are aligned.

Focus is on the process of learning.

A variety of teaching and learning activities are designed, contributing to meeting the needs of diverse learners.

Learning design documentation can be adapted to some extent to meet specific needs of learners and the context of learning.

Dynamic Generative Knowing (DGK)

Learning design is aimed at developing learners' abilities to not only engage in inquiry, but to develop learners in ways that enable them to be comfortable with unexpected, complex challenges that are a feature of our possible futures.

The 6PoLD will be strongly evident, as using learners' authentic issues / problems of understanding etc. is a core premise of DGK. Once authenticity is strongly met, this creates the space for the remaining principles to be in action. In addition, necessary in DGK are plentiful opportunities for learners to make judgments in, for example evaluating others' ideas and giving feedback in constant iterative cycles of dialogue.

Learning design needs to include improving learners' collaborative inquiry skills.

Focus is on developing learners as future oriented, human centred practitioners with strong agency.

Learning design documentation enables fluidity, while providing clarity on qualities and capabilities required of participants and teaching and learning strategies that evidence DGK.

IAL Research Division

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This publication should be attributed as Bound, Helen (2024). Future Oriented Pedagogies – FOP Research Note 1. Singapore: Institute for Adult Learning.

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