
Dialogical Teaching:

Investigating awareness of inquiry and knowledge co-construction among adult learners engaged in dialogic inquiry and knowledge (co)construction

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Contents

	1
Executive Summary	7
Recommendations	8
1. Introduction	9
1.1. Why a study of dialogical teaching?	9
1.3 Methodology	10
1.4 Definitions	15
1.5 Structure of the report	16
2. Dialogue, inquiry & knowledge (co)construction	17
2.1. Dialogical teaching	17
2.2. The dialogical construction of meaning, and inquiry	19
2.3. Dialogic inquiry	21
2.4. Meaning making as a socio-cultural activity	22
2.5. Knowledge co-construction	23
2.6 Bringing multiple 'tools' together	24
2.7. Conclusion	27
3. Workplace Learning & Performance	29
3.1. Learners' perception of the value of dialogical teaching and learning	30
3.2. Moving from monologic teaching experiences to dialogical teaching and learning	33
3.3. Changes in roles and responsibilities	34
3.4. Learners' awareness of their own dialogical inquiry processes	36
3.5. Co-construction of knowledge	43
3.6. Conclusion: Relationship between learning activities, inquiry and knowledge building	45
4. Computer Supported Collaborative learning and Knowledge Building (MLT802)	48
4.1. Learners' perception of the values of dialogical teaching and learning	50
4.2. Moving from didactic teaching (direct instruction) to dialogical teaching and learning	53
4.3. Awareness of dialogic inquiry process and metacognition	57
4.4. (Co)construction of knowledge	61
4.5. Conclusion: Learning design, inquiry and knowledge building	65
5. Rising Above	68
5.1. "Rising above" the two case studies	69
5.2 Experience of learning	70
5.3. Information – Multiple Voices and Perspectives	71

5.4. Knowledge building – shared control and meaning making	71
5.5. Multiple iterations and opportunities	72
5.6. Learning outcomes	72
5.7. Challenges faced by learners and the educators	74
6. Conclusion and Recommendations	77
6.1 Individual educator agency	80
6.2 Developing educator capabilities	81
6.3 Developing learners' capabilities	82
6.4 Changes in the design of curriculum	82
6.5 The need for system change to support approaches such as dialogical teaching	83
6.6 Specific Recommendations:	84
References	85

Figures and Tables

Figure 1.1: Age Range and Gender	11
Figure 1.2: Number of Years Worked and Current Occupation	11
Figure 1.3: Education Level and Professional Training	12
Figure 1.4: Age Ranges and Gender	13
Figure 1.5: Number of Years Worked and Current Occupation	13
Figure 1.6: Education Level and Professional Training	14
Table 1.1: Defining Key Concepts.....	15
Figure 2.1: Map of dialogic inquiry	22
Figure 2.2: The Spiral of Knowing (Wells 2000, p.70).....	25
Table 2.1. Interaction Analysis Model (IAM) for Examining Social Construction of Knowledge	25
Figure 2.3: The spiral of understanding and the IAM.....	27
Figure 3.1: Ecology room	30
Table 3.1: Summary of Dependent t-test of First & Last Inquiry Map Scores.....	38
Figure 3.2: Changes over time in significant aspects of dialogical inquiry.....	38
Figure 3.3: Ulysses' map of inquiry	39
Figure 3.4: Holly's map of inquiry	40
Table 3.2: Description for Reflection Types	41
Figure 3.5. Relationship between Reflection Types & Course Scores	42
Figure 3.6: Odell's concept map.....	43
Figure 3.7: Neil's concept map.....	44
Table 4.1. Applications of principles of Knowledge Building in the course CSCL & KB	48
Figure 4.1. Map of inquiry of Dylan over time	58
Figure 4.2. Map of inquiry of Quentin over time	58
Table 4.2. Summary of Dependent t-test of First and Last Inquiry Map Scores	59
Figure 4.3. Changes over time in significant aspects of dialogical inquiry.....	61
Figure 4.4. Changes in conception of learning.....	62
Figure 4.5. Frequency count of notes at different phases of interaction for different sessions	63
Figure 5.1: Dialogic teaching model.....	70

Figure 5.2: Concept map of the dialogic teaching and learning model	75
Figure 6:1: Continuum from monologic to dialogic.....	78
Figure 6.2: Roles and metaphors of learning in relation to monologic and dialogic approaches	79

Executive Summary

A characteristic of the new economy is a market-driven demand for flexibility and change that has put reflection and lifelong learning high on the agenda (Brinkmann & Tanggaard, 2013). Reflection and lifelong learning are not the only capabilities required for individuals to thrive in these conditions of uncertainty and change. Any number of capabilities such as critical thinking, resilience, creativity, thinking on your feet can be added to such a list. But it is not the 'list' that is important, rather it is a way of thinking and being that enables use and development of such capabilities for individuals to thrive in times of uncertainty and ongoing, rapid change. The authors of this report argue that this suggests a need for a shift from a traditional focus on educator and content to dialogical processes of teaching and learning that bring a focus to learners and learning. If as educators, in the Singapore context, we want to provide opportunities courses for development of reflective analysis, lifelong learning and mastery (SkillsFuture, 2015), it is incumbent on us to explore promising pedagogies like dialogical teaching, learning and inquiry that position learners as (co) constructors of knowledge, as researchers of questions, issues or problems they have identified, as involved in making judgements about their work and the work of their peers, and more.

The lead researchers undertook a study of dialogical teaching in two different Masters courses at a Singapore University (namely, Workplace Learning and Performance, and Computer Supported Collaborative Learning and Knowledge Building), taught by the researchers. This deeply qualitative study collected multiple forms of evidence from these two case studies over the time of each Masters' course to address the following research questions:

1. How do adult learners in formal graduate courses develop awareness of their inquiry and how do they co-construct knowledge?
2. How do adult learners perceive the relevance and value of dialogical approach to teaching and learning?
3. What are the implications of the dialogical approach for the practices of adult educators?

We define dialogical teaching as involving learners in the collaborative construction of meaning through dialogue and interaction with multiple artefacts. Learners actively participate through having control over topics for inquiry and the learning processes, drawing on their rich experiences as resources for learning. Key features of dialogical teaching are the use of authentic problems which learners select, thus giving them some control over the learning processes and design of the spaces of learning.

Findings from both cases illustrate similar experiences of the dialogical teaching and learning process, including challenges learners experienced, overcoming the theory-practice divide, development of deeper understanding, and developing identities as learners and as practitioners. Paying attention to emergent and deepening meta-cognitive processes involved in dialogical inquiry and knowledge-co-construction processes was facilitated through the use of tools such as the Map of dialogical inquiry and concept mapping where students could see changes and growth in their understandings and expansion in their ways of thinking. Importantly the changes in identity as learners is a powerful outcome that positions learners well for facing future, unknown challenges.

Overall, students deeply valued the dialogical teaching approach that afforded them the opportunity to clarify, question, interpret, and work with different kinds of evidence to co-construct knowledge amidst multiple perspectives and voices. However, in both cases students reported considerable challenges. For example, students reported a perceived lack of structure, were

challenged by the multiple perspectives and voices, by the discovery that their views and thoughts were valued, that they were the constructors of knowledge and of meaning—making and as such had to take responsibility for their own learning. This was the students' first experience of dialogical teaching thus they were unable to 'see' the structure of the courses as it was not familiar to them. They were initially confused, but learnt that they had to take charge of their own learning. These challenges lay bare the previous learning experiences based on monologic teaching. Students specifically commented that the demands of previous courses require a particular kind of reproduction, typical of monologic design and facilitation.

Despite the challenges and struggles, students valued this approach; the ability to work with multiple perspectives, to be creative, to be able to offer and receive true critique and develop creative solutions are all hallmarks of knowledge workers. Dialogical teaching offers an important alternative to monologic teaching that better meets the needs of today's, and the future workforce. While dialogic teaching is more readily applicable to longer courses where learners have time to develop relationships, trust, undertake inquiry, co-construct knowledge; for short courses, there are aspects of dialogical teaching that can be used to encourage the development of skills and capability and develop deeper understanding. These aspects may include for example, focusing on ways of thinking such as Bound, Chia, and Karmel (2016) found in a course for IT Network engineers where students followed a particular logic provided to them then worked collaboratively to solve problems from simple to complex.

Recommendations

Dialogic teaching is one of a range of approaches that move away from monologic teaching with the following key principles:

- learners have choice;
- authentic problems and issues are at the core of the curriculum design (inclusive of assessment);
- multiple(?) forms of inquiry are used; and
- dialogue amongst(?) learners whose voice is valued is given more time than educator talk.

There are many constructivist approaches that are inclusive of dialogue between learners. Educators may not be ready to move into all aspects of dialogical teaching, but could be encouraged to experiment with various aspects of dialogic teaching. This is a useful way in which to build pedagogical capability. However, educators need a sense of permission (from themselves and from the systems that they work within) and/or support to try out different techniques and approaches. Consequently, we have recognised that there are three main challenges in implementing dialogic teaching approaches, or aspects of this approach:

- *The need for system change to support approaches such as dialogical teaching;*
- *Changes in the design of curriculum; and*
- *Capability development of educators.*

These are discussed in detail in Chapter 6.

1. Introduction

A characteristic of the new economy is a market-driven demand for flexibility and change that has put reflection and lifelong learning high on the agenda (Brinkmann & Tanggaard, 2013). Reflection and lifelong learning are not the only capabilities required for individuals to thrive in these conditions of uncertainty and change. Any number of capabilities such as critical thinking, resilience, creativity, thinking on your feet can be added to such a list. But it is not the 'list' that is important, rather it is a way of thinking and being that enables use and development of such capabilities for individuals to thrive in times of uncertainty and ongoing, rapid change. The authors of this report argue that this suggests a need for a shift from a traditional focus on educator and content to dialogical processes of teaching and learning that bring a focus to learners and learning. If as educators, in the Singapore context, we want to provide opportunities for development of reflective analysis, lifelong learning and mastery (SkillsFuture, 2015), it is incumbent on us to explore promising pedagogies like dialogical teaching, learning and inquiry that position learners as (co) constructors of knowledge, as researchers of questions, issues or problems they have identified, as involved in making judgements about their work and the work of their peers, and more.

1.1. Why a study of dialogical teaching?

Scholarly studies of both children and adults have shown that in many classrooms, educators dominate the talk or direct the conversational interactions (Alexander, 2005; Applebee, Langer, Gravett & Schaik, 2005; Nystrand, & Gamoran, 2003; Hogan, 2014; Rule, 2007). Such monologic approaches to teaching assumes an instructional approach where it is the educator the students are looking to - the one with *the* authoritative voice. Monologic classrooms, where educators practice the "recitation script" (Tharp & Gallimore, 1991) are characterized by lecturing and individual seatwork. Reasons offered (Tharp & Gallimore, 1991) as possible contributing factors to such instructional practices, include the pressure to cover a prescribed curriculum and accountability for students' performance in standardized tests. Edwards and Mercer (2013) suggest that when an educator experiences the tension between their espoused beliefs and perceived external requirements, they tend to conform to perceived expectations. In these ways traditional approaches are not only reproduced but reinforced.

In contrast to monologic teaching, dialogic teaching has been described by Reznitskaya and Gregory (2013) as "a pedagogical approach that involves students in the collaborative construction of meaning and is characterized by shared control over the key aspects of classroom discourse" (p. 114). Dialogical teaching facilitates deep learning. By encouraging dialogue, reflection, and learner autonomy in the classroom, the educator is able to help adult learners to construct meaning from a wide variety of events or information. Dialogic teaching also caters to autonomous adults by encouraging shared control among the educator and adult learners in the teaching and learning process.

The Singapore discourse and its reality that its people are its strength places a particular emphasis on workforce development in this small nation state, especially critical in meeting the discourse of staying ahead in highly competitive global markets and evolving new economies. Yet, the introduction of 21st century skills in the pre-employment education landscape does not sit well with Hogan's (2014) findings from his study of classroom practices of more than 200 elementary and secondary schools. Hogan found that most of the classroom talk was educator-directed instruction focusing on procedural information or close-ended questions seeking short answers. Likewise, the study by Vaish (2008) on 51 Singapore classrooms found that most classroom talk followed the Initiate-Response-Evaluate (IRE) pattern reported by Mehan (1979) and individual seatwork was

prevalent. As individuals transition from school to the world of work and navigating labour markets, they need to be able to thrive in uncertain and changing contexts. This places an emphasis not on structured thinking and simple problems but on complexity, on being confident to contribute to complex naming and solutioning and navigating unknown futures.

1.3 Methodology

Research study participants were sampled from two groups of postgraduate students in a Singapore Education Faculty. Students were engaged in the dialogic inquiry of problems encountered in their workplace. They were encouraged to raise questions, to analyse tentative answers and experiment with possibilities, and to question long held assumptions and paradigms. The educators for each group surfaced the idea for this research project with a shared interest in dialogical inquiry (Stack, 2007; Bound 2010) and in knowledge co-construction. As we were practicing these approaches in our own classrooms, we wanted to find out more about how students experienced these approaches and what the possibilities were for expanding the approach beyond the boundaries of our own classrooms in the adult education sector in Singapore.

The research questions posed were:

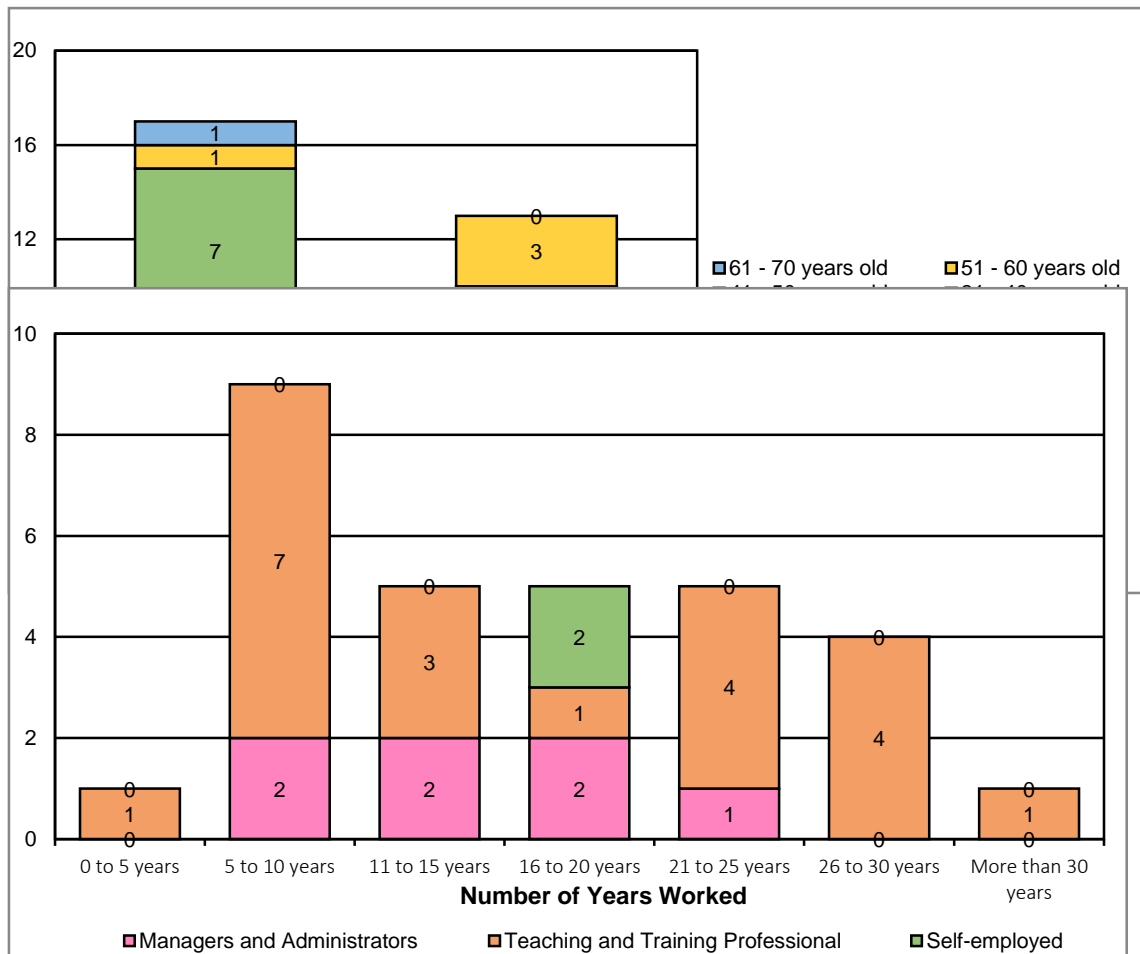
4. How do adult learners in formal graduate courses develop awareness of their inquiry and how do they co-construct knowledge?
5. How do adult learners perceive the relevance and value of dialogical approach to teaching and learning?
6. What are the implications of the dialogical approach for the practices of adult educators?

1.3.1. Profile of Research Participants

Participants were recruited from two different Master's level courses at a Singapore University. Lessons were delivered in classrooms, and online (e.g. forum discussion). The Workplace Learning and Performance (WPL&P) course had 30 participants and Computer Supported Collaborative Learning and Knowledge Building (CSCL&KB) had 14 participants.

Workplace Learning & Performance Participants (WPL&P): The 30 participants in this course were aged between 21 years to 70 years, 57% of them were male (Figure 1.1). Ninety percent of participants were of Chinese ethnicity, and the rest were of Malay, Eurasian, and Indonesian ethnicities. About 70% of the participants were teaching and training professionals from both the pre-employment and continuous education and training sectors, about 24% were managerial and administrative professionals, and the rest were self-employed. In terms of work experience, the number of years ranged between 5 to 36 (Figure 1.2). Class and group discussions, student artefacts and assessment artefacts were collected by the researchers and sixteen participants were interviewed.

Figure 1.1: Age Range and Gender



As participants were enrolled in a postgraduate programme, every participant had completed a Bachelor's degree. About a third of the participants had completed a Master's degree prior to the current postgraduate programme. In addition to these tertiary education degrees, 60% of the participants had completed professional training such as the Workforce Skills Qualification (WSQ) Diploma in Adult and Continuing Education (refer to Figure 1.3 for further breakdown).

Figure 1.2: Number of Years Worked and Current Occupation

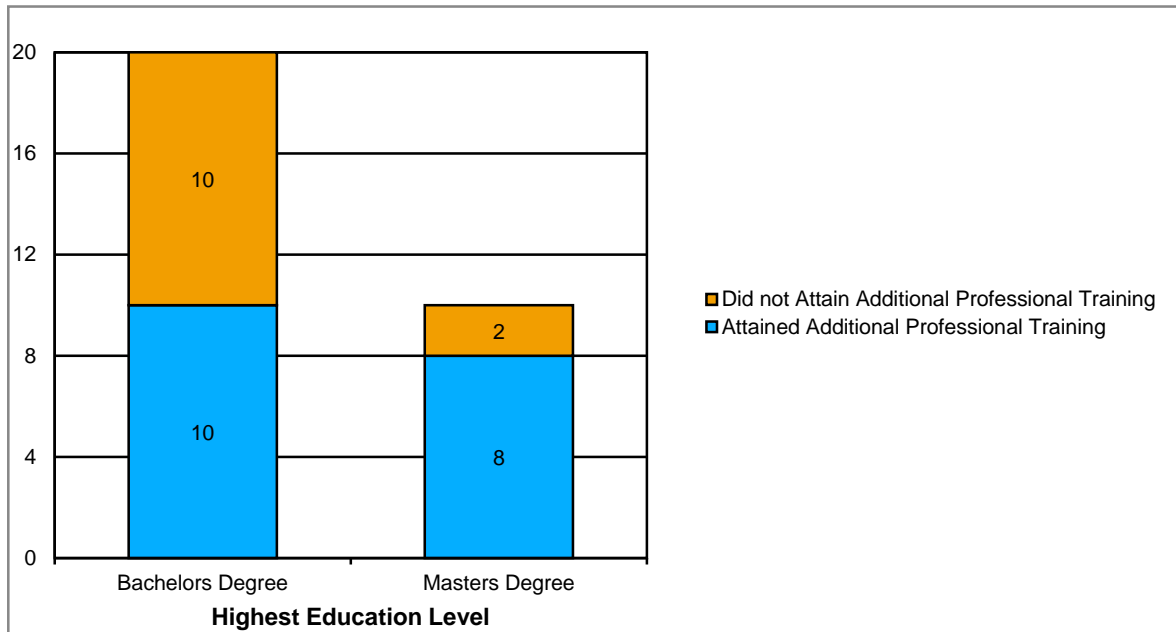


Figure 1.3: Education Level and Professional Training

Computer Supported Collaborative Learning and Knowledge Building (CSCL&KB): The 14 participants in this course were aged between 31 years to 60 years, and about 67% were male (Figure 1.4). About 78% of participants were of Chinese ethnicity, and the rest were of Malay, and Indian ethnicities. Teaching and training professionals made up 67% of the participants, all of them from the pre-employment education sector, a participant was an administrative and support services professional, and another participant was a managerial and administrative professional. One participant did not disclose their occupation. In terms of work experience, the number of years ranged between 5 to 33 (Figure 1.5). Out of the 14 participants who gave consent to participating in the research study, only nine participants were interviewed. Since the participants were enrolled in a postgraduate programme, every participant had completed a Bachelor degree. Seventy-eight percent of the participants had completed a Master degree prior to the current postgraduate programme. In addition to these tertiary education degrees, 60% of the participants had completed professional training such as the WSQ Diploma in Adult and Continuing Education (refer to Figure 1.6 for further breakdown). Class and group discussions, student artefacts and assessment artefacts were collected by the researchers and 9 participants were interviewed.

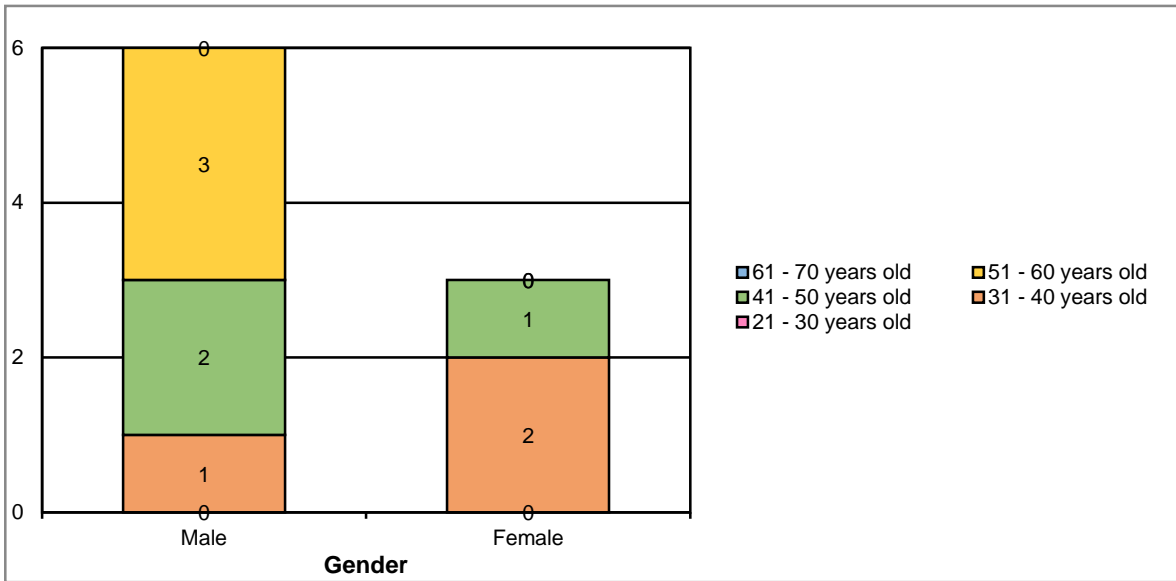
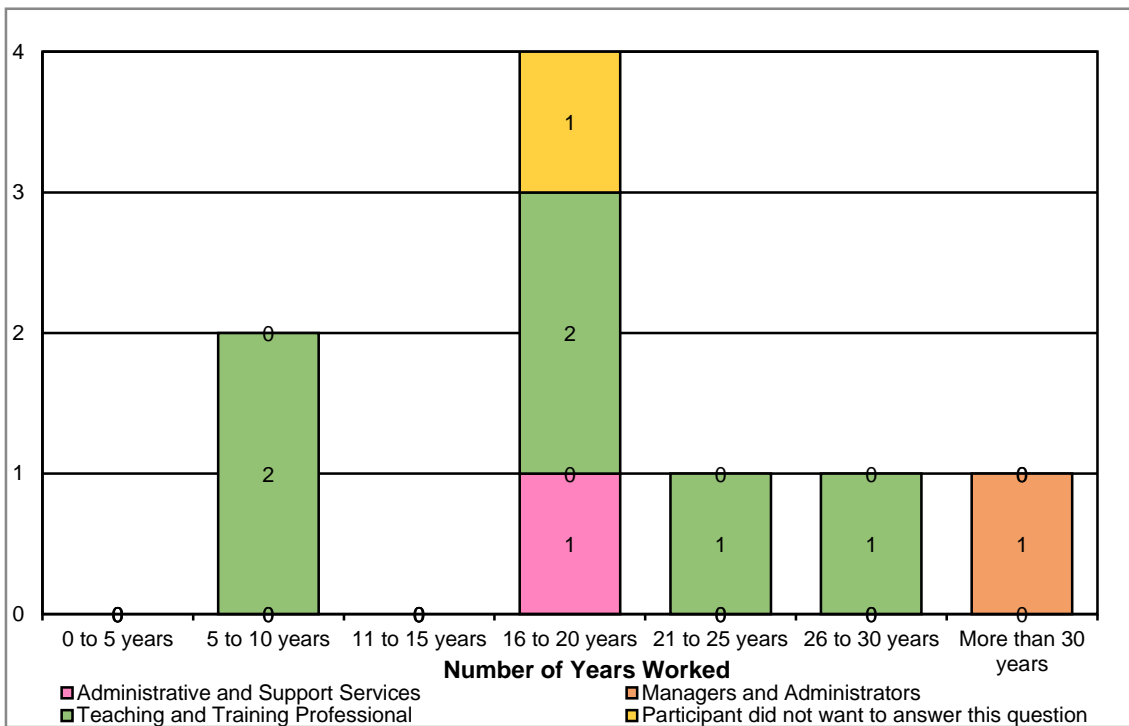


Figure 1.4: Age Ranges and Gender

Figure 1.5: Number of Years Worked and Current Occupation



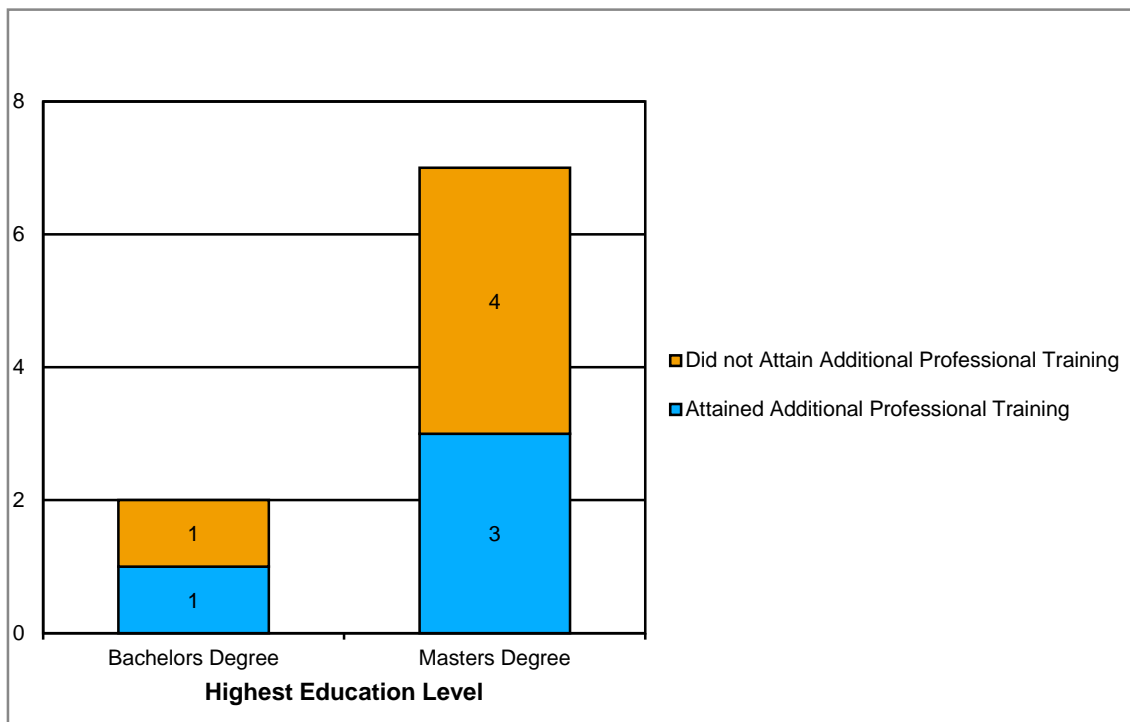


Figure 1.6: Education Level and Professional Training

1.3.2. Data Collection

The research questions required a deep dive into the learner experience, thus a qualitative case study approach was used. Participants completed a form to collect their demographic information. About half of the participants in each group were invited to be interviewed (semi-structured) by a Research Assistant (i.e. 16 from WPL&P, 9 from CSCL&KB). Based on a range of criteria including age and profession, purposive sampling was used to select participants to be interviewed. The third piece of data collected was the aspects of inquiry (i.e. Inquiry Maps) that participants completed using a Microsoft Excel spreadsheet to rate their extent of engagement in different aspects of inquiry (i.e. 1 = lowest, 5 = highest) during the course. The spreadsheet automatically generates a spider chart on their engagement with the different aspects of inquiry in a particular session, making visible changes in engagement with different aspects of inquiry across time. The fourth piece of data was concept maps completed by the participants during the course. Sobek (a text mining tool) was used to generate the initial map with data from the CSCL&KB course. CSCL&KB learners worked in assigned groups, elaborating on the map using tools such as C-Map. The progression of participants was analysed over time in terms of number of valid concepts, number of linkages, level of hierarchies and number of crosslinks. In WPL&P, students developed two concept maps which they drew. Group discussions from every session were transcribed to capture aspects of knowledge (co) construction. The fifth piece of data was the personal reflection of the learning journey by the participants themselves, including the use of the tools of inquiry which formed part of the final assessment. In the case of the WPL&P course, this constituted a report which was a hybrid of a plan for a learning intervention and academic writing.

In addition to the participants (n=25) who were interviewed and the range of artefacts collected from each of the total 44 students, stakeholders from higher education institutions were engaged. A reference group involving members of teaching and learning centres from IHLs, adult educators, and

private training providers was conducted towards the end of the study, to gather their feedback on the interpretation of the results of this study, and importantly to discuss implications of the study.

1.3.3. Data Analysis

Interviews were audio recorded, transcribed, and imported into a qualitative software package (i.e. Nvivo) for analysis. Pseudonyms were given to every participant to ensure anonymity for ethical reasons. The pseudonyms selected were not culturally specific to avoid compromising the anonymity of participants as a small number of participants were of certain ethnicities and could therefore be identified quite easily with culturally specific pseudonyms. Through reading the transcripts, themes were developed through multiple coding by the research team. Thereafter each transcript was coded against themes before being further analysed into sub-themes. Quantitative analysis of the demographic data and Inquiry Maps was conducted using quantitative software packages (i.e. SPSS and Microsoft Excel). Once the different types of data had been analysed separately, the researchers looked across the analysis from each data set to identify commonalities, differences and anomalies. This process of the different data sets 'speaking' to each other involved multiple rounds of discussion, checking back through the data, identifying additional analysis and repeating the process until the team was satisfied that our interpretation was thoroughly based in the data.

1.4 Definitions

A number of key concepts in this report need defining, namely, dialogical teaching, knowledge co-construction and dialogic inquiry. Because the literature also discusses knowledge building in relation to knowledge co-construction, we have also included this concept. Chapter 2 considers these concepts in depth, but for easy reference we set out the definitions as they are used in this study in Table 1.1. Dialogic inquiry and knowledge co-construction are sub-categories of dialogical teaching as both are implicit in the process of dialogical teaching.

Table 1.1: Defining Key Concepts

CONCEPT	DEFINITION
Dialogical teaching	<p>A pedagogical approach that focuses on designing situations and activities (e.g., inquiry), with some degree of challenge appropriate for the participants, to engage in shared meaning making through dialogue. The expectation is for participants to exercise epistemic agency in achieving shared goals.</p> <p>As learners interact with multiple artefacts in the making of meaning and exercise of agency in achieving goals, they draw on their rich experiences as resources for learning.</p>
Dialogical learning	<p>When participants engage in shared meaning making towards common learning goals through productive dialogues characterised by democratic participation among all participants.</p>

Dialogic Inquiry	Moving across different ways of thinking, often experiencing the accompanying emotions and sense of body. Inquiry may range from posing questions and experimenting with possibilities to challenging long held assumptions. Inquiry encounters difference and requires the development of a sense of being comfortable with difference (Bound, 2010).
Knowledge co-construction	Knowledge co-construction takes place in a problem space. The 'space' is defined by an activity's goals and intent. The aim of knowledge co-construction is to build shared agreement statements and applications of newly constructed knowledge.
Knowledge building	Knowledge building takes place in a community. The aim is developing understanding to advance knowledge, that is, continual deepening of understanding of ideas (Chai & Tan, 2009). Knowledge building require authentic problems drawing from the "world of human knowledge as its intellectual workspace" (Bereiter & Scardamalia, 2014, p.36).

1.5 Structure of the report

The following chapter analyses the literature in relation to our research questions, concluding with some thoughts in relation to the third question – the implications for educators of the dialogical approach. The next two chapters set out the findings from each case – WPL and Performance and CSCL&KB. We titled the fifth chapter, 'Rising above' as here we put forward an explanation of how and why it is that students engage in deep learning using the dialogical approach. The concluding chapter sums up the implications with recommendations from the authors.

2. Dialogue, inquiry & knowledge (co)construction

This chapter commences with examining the literature on dialogical teaching highlighting the need for authentic problems, issues or tasks; the dialogical construction of meaning, and inquiry processes. This leads to a section on dialogical inquiry focusing on the Map of Dialogical Inquiry (Stack, 2007; Bound, 2010). We then make visible the assumptions we make about learning in relation to dialogical teaching. An examination of knowledge building is followed by a section that brings together the various frameworks and tools examined in the Chapter, prior to our concluding comments that briefly consider the implications for educators in relation to our research questions.

2.1. Dialogical teaching

In Chapter 1 we defined dialogical teaching as involving learners in the collaborative construction of meaning through dialogue and interaction with multiple artefacts. Learners actively participate through having control over topics for inquiry and the learning processes, drawing on their rich experiences as resources for learning. Key features of dialogical teaching are the use of authentic problems which learners select, thus giving them some control over the learning processes and design of the spaces of learning.

Dialogic teaching has the following characteristics:

1. **Power Relationship:** In a dialogic classroom, there is a democratic power relationship between participants and educator over the content and form of discourse. Students take on key responsibilities for managing turns of talk, offering new ideas, seeking clarification, evaluating one another's ideas, and suggesting changes.
2. **Space for Exploration:** The trigger for dialogic learning is often questions that are "fundamentally open or divergent...in terms of allowing a broader degree of uncertainty in what would constitute an adequate answer" (Burbules, 1993, p. 97). The open-ended question is to trigger inquiry rather than to assess students or to have convergent answers sanctioned by the educator.
3. **Epistemic Dialogue:** Students who are engaged in dialogic learning are concerned about epistemic quality of ideas; they often offer elaborate and justified explanations for their thinking, support their ideas with examples, reasons, and evidence. They also consistently engage in meta-level reflection by examining the process of the discussion and the epistemic criteria for reasoning, thus creating opportunities for self-correction (Burbules, 1993; Splitter & Sharp, 1996). Examples of meta-level activities include seeking clarification, connecting ideas across contexts and participants, and reflecting on levels of understanding. Through the dialogic process, the students engage in collaborative co-construction of knowledge by building on one another's positions and justifications, integrating the preceding contribution to advance the group's reasoning.
4. **Epistemic Feedback:** Rather than providing answers to students or dichotomizing students' answers as right or wrong, an educator advances the inquiry by paying attention to the process and quality of ideas, seeking elaboration for the epistemic basis of the answers, such as

justification, asking for evidence, and challenging students with alternative perspectives (Gregory, 2007).

The design of spaces is unpacked later in this section, but first we will consider what is meant by authentic problems, and the dialogical, collaborative construction of meaning through dialogue and interaction with multiple artefacts.

2.1.1. Authentic issues, problems and tasks

The importance of using authentic issues, problems, and tasks is emphasised across literatures such as knowledge building and co-construction (Bereiter & Scardamalia, 2014; Chai & Tan, 2009), teaching for understanding (Wells, 1999, 2002) and in some of the assessment literature (Bound, Chia & Karmel, 2016; Boud, 2000). Authenticity refers to purposeful engagement with the context (Trede & Smith, 2012) of work /professional/ vocational practice. Authentic issues and problems are typically open or divergent, allowing a broad degree of uncertainty in what would constitute an adequate answer (Burbules, 1993). Authentic experiences enable learners to experience holistically the complexities of vocational /professional life and develop practitioner ways of thinking and being (Bound, et al., 2016). Solving authentic problems needs to take account of the complexity of the specific context(s) of the problem as performance, actions and activity take place within a context. Without the use of authentic problems / issues / tasks, design of learning is often relegated to atomised tasks denying learners the potential for developing deep understanding (Bound, et al., 2016).

Authenticity in formal courses is typically indicated by the use of “real work” activities and practices, and/or its embeddedness in a real work environment. This may also include tasks and activities based on models and/or simulations that focus on application of concepts and skills like problem solving, trouble shooting and so on. Authentic tasks may be defined as having “real-world relevance and utility” and “appropriate levels of complexity”, and may be “generative” (Herrington, Oliver & Reeves, 2002, p. 3). Authenticity is characterized by opportunities for the application and re-contextualisation of learning and its contribution to work improvement. In their authenticity continuum, Deakin University suggests that unlike traditional approaches to designing learning that are educator centred and focus on contrived tasks and recall; and approaches to assessment that provide only indirect evidence of performance; authentic design of learning centres around performing a real task requiring application. It is learner centred where assessment conducted provides real evidence of performance. Authentic problems, issues and tasks, are far more than ensuring relevance to learners and their learning. Using authentic problems requires active engagement of learners and contributes to their professional identity and their capabilities as analysers and problem solvers. Additionally, authentic problems often require learners to engage in some form of research, be it desk-top research and / or collecting empirical evidence and data analysis.

In workplaces, a lot of work is collective in nature (requiring interaction and interdependence between roles, individuals, teams and networks); what one person does is interconnected and has implications as well as consequences for others (Bound, et al, 2016). In writing about the medical field, Hodges (2013) argues that knowledge is developed collectively, noting that team-based competence has a direct impact on patient outcomes and rejects the notion that knowledge and competence is something held by individual practitioners. Others also note the mutually constitutive and dialogic nature of knowledge (Bound et al., 2016; Wells, 1999, p. 75), the collaborative nature of work, and the holistic or “authentic wholeness” (Rose, 1999, p. 154) of real work. Bound, et al. use an example of learning in a course for rota commanders (leaders in fire-fighting settings), to illustrate how authenticity occurs “not in the learner, the task, or the environment, but in the dynamic interactions among these various components ... authenticity is manifest in the flow itself, and is not an objective feature of any one component in isolation” (2016, p.48). “Dynamic interactions”, “integrated-ness” of

task, environment/setting, and learners' active participation enable authenticity, and teaching and learning as a social phenomenon.

Authentic design of learning and assessment encompasses, the dialogic nature of knowledge, the wholeness of real work and the dynamic interactions of real work environments. This complexity provides adequate challenge for inquiry and the dialogical co-construction of meaning. In order to prepare or further develop learners for the complexities of work, authentic problems, issues and tasks need to be brought into classroom spaces and where possible for real work environments to be used. Authentic design can be understood as a spectrum from learning in real work settings at one end of the spectrum to bringing the complexities of work into classroom or tech enabled settings at the other end of the spectrum.

2.2. The dialogical construction of meaning, and inquiry

The dialogical construction of meaning involves the whole person in contexts in which they are learning and / or working. The complexity of the workplace referred to in the previous section, is inclusive of the situated socio-material context - artefacts, dominant ways of thinking and being in that setting, and the social relations of the setting. Meaning is also mediated by social, economic, political and environmental contexts, as they permeate everyday language, activity and actions. Therefore, processes of meta-thinking, inquiry and reflection are needed by the workforce to not only make sense of their specific setting of work, but of what mediates the practices, judgements and decision-making in a particular setting. Meta-thinking, inquiry and reflection require dialogue suggesting a need to actively structure it into the curriculum, including assessment, which could for example, be the end product or outcome of an inquiry process.

In the following section, the authors consider what the literature contributes to our understanding of dialogue and inquiry in the construction of meaning.

2.2.1. Dialogue

The purpose of a focus on dialogue is more than simply moving away from an approach where the educator positions themselves as the 'expert', the authoritative voice, the one to whom learners look to and look at as they transmit knowledge for learners to acquire. Rather, dialogue about authentic issues is a critical means of preparing for, encouraging, facilitating, and extending learners' capacity and capability for interpretation, critique and rigor, and thus contributing to their journey towards being knowledgeable, professional practitioners. For Bakhtin, the expression and creation of meaning in dialogue is never complete, never closed and always oriented toward the future. In educational settings (be it educational institution, work or community settings) an important purpose of participants being involved in dialogue is that the process contributes to knowledge building and deep understanding. Participants' journey towards deep understanding manifests itself in further action, for example, how they deal with a new challenge in their social world or in the extension or modification of ideas (Wells, 2002).

In addressing the key curriculum design question of what an educator wants their learners to be and become, an essential tool is dialogue. Stack (2007) suggests that good dialogue requires bringing a "state of being" to the process of dialogue and inquiry which she defines as "a state of tentativeness, a state of willingness to look deeply, to be open to surprise, to nurture those who are tentative (p.328)." 'Good' dialogue also involves an engagement in "insight making" (p.330). Stack (2012) describes aspects of 'good' dialogue as:

- Ability and commitment to create shared meaning – construct understandings, shared language, using humour and small talk, creating shared spaces, moving into perspectives of others, engaging in hermeneutic process;
- Rigour in process and thinking – moving around the map of dialogical inquiry into different voices and modes of inquiry, applying critical thinking, iterativeness;
- Tuning into the different stages of idea development, using openness to new ideas and criticality appropriately;
- Being inclusive and caring of others – listening, empathising, giving time, recognising and meeting the different needs of others; and
- Being self-reflective of the discourse process – meta-cognition, recognising the limitations, naming and challenging what is happening and moving to alternative discourse methods.

The dialogical process involves the whole person in learning through engaging in authentic activities. The process influences identity and self-image and how participating individuals are regarded by others (Wells, 2002). Wells (2002) argues that it is important that dialogical processes and experiences be a positive one for participants. Similar to Stack, (2007), Wells notes that, “students should be encouraged to ensure that all contributions to the dialogue are formulated as clearly and coherently as possible, and accepted and treated with respect – even if this takes the form of disagreement” (p.10). Gunawardena, Lowe & Anderson (1997) argue that points of dissonance and even disagreement are important in contributing to knowledge building. This will be discussed further in a later section on knowledge building and knowledge co-construction.

Human cognition has a dialogical basis (Edwards, 2005a, p.172). As dialogue is internalised (Vygotsky, 1978), so are alternative perspectives expressed in the dialogue, contributing to a restructuring of cognition to enable accommodation of multiple perspectives (Ferryhough, 2008). Thus, in dialogical processes, participants encounter difference; a degree of comfort with being uncomfortable with multiple perspectives and difference contributing to meaning making and thus the potential for restructuring of cognition. The quality of the dialogue improves thinking (Wegerif, 2007, p.55). Wells (2002) suggests that provision needs to be made for multiple occurrences for goal oriented dialogue for participants to engage in “progressive discourse” (Bereiter, 1994), where they propose, explore and evaluate alternative ideas, explanations and problem solutions and, together, to construct the most satisfactory outcome of which they are capable. Bereiter & Scardamalia (2014) would add critical evaluation of ideas, the marshalling of evidence to support or disconfirm them as part of the process of knowledge building. This process of building higher level structures of ideas entails the mental state that Csikszentmihalyi (1990) and Stack (2007) call flow. Inquiry is an explicit aspect of knowledge building.

2.2.2. Inquiry

Inquiry is a stance towards experience and information – a willingness to wonder, to ask questions and to attempt to answer those questions through the collection of relevant evidence. The ability to collect and analyse relevant evidence provides key data for asking further questions, meaning-making and knowledge co-construction. Inquiry involves experimenting with possibilities, challenging long held assumptions and being open to critical review and improvement (Bound, 2010; Wells, 2002). Moving across different ways of thinking, experiencing the accompanying emotions and sense of body are an explicit aspect of both the stance and the process of inquiry. Being comfortable with difference is not about being argumentative; rather, it requires “socially shared, relationally

responsive, perceptible understanding” (Shotter & Billig, 1998, p. 25) between those involved. Inquiry is a socially negotiated process, requiring both personal and collective meaning-making. Participation in inquiry over time fosters collaborative dispositions and agency as the process moves towards developing understanding that enables “effective and responsible action” (Wells, 2002, p.33).

In designing curriculum, and facilitating curriculum educators should feel comfortable with a division of labour that flattens the hierarchical power relations between educator and participants. Curriculum is not about a rigid process or documentation, but about working towards outcomes that foster deep understanding, agentic learning and action, collaborative approaches to inquiry and developing solutions. These are all ‘big’ outcomes of being a lifelong learner. Once established in a given setting, inquiry processes and stances become established norms (Wells, 2002).

2.3. Dialogic inquiry

For the purposes of this study, dialogical inquiry is based on the map of dialogical inquiry, developed by Stack (2007), Bound (2010) and Stack and Bound (2012). Stack (2007) states that the process of inquiry can be specifically taught. She found that by asking four critical thinking questions in her physics classes, her 16 to 17- year old physics students moved from being educator dependent to owning the inquiry process themselves. When posing these four questions, Stack used an experiential, problematising approach. She asked students to apply the four questions below to the explanations they and others arrived at when solving problems. The four critical questions were:

- Is it intelligible? (What further explanations or experiences can help me understand it?)
- Is it plausible? (How is it convincing, logical, relevant, trustworthy, fit into a bigger picture? What might be the flaws or limitations?)
- Is it useful? (How does it have greater explanatory or predictive power over other models? How does it fit into other ways of explaining the world? How is it significant?)
- Is it believable? (What are my underlying beliefs and values about the world and how do these new ideas interact with these?)

These questions not only give rigor to the dialogical inquiry process but deepen the inquiry process; additionally, in using them, students take responsibility for the inquiry process. From watching her students work through these processes, she identified eight aspects of scientific inquiry that drew on and combined the four aspects from Kolb’s learning model (experiencing, reflecting, theorising, applying) with Julia Atkin’s integral learning model (detail, logic, holistic, feeling). All aspects need to be covered in cyclical learning processes to achieve integration of learning.

It was these aspects that Bound and Stack used to further develop Stack’s model into the map of dialogic inquiry by analysing online posts over a 13-week semester for an online module in the Bachelor of Adult and Vocational Education, University of Tasmania (Bound, 2010) (see Figure 2.1). The *Map of Dialogic Inquiry* is so called because it represents a valuing of dialogue and multiple perspectives to create meaning. The model is intended as a tool to help learners and educators be more aware of the different ways they learn, teach and inquire. The dialogical inquiry map enables people to ‘see’ the different learning aspects they might use when having inquiry conversations. People might see themselves using two or more of these aspects simultaneously or oscillating between them, or moving through different aspects in a more structured way. It is not cyclical, but often people take well-trodden paths, avoiding areas they find difficult. “Good inquiry is likely to visit

many places on the map” (Stack, 2012, p.1). The Map is also useful for educators as they reflect and inquire into their approach to learning design (Bound, 2010).

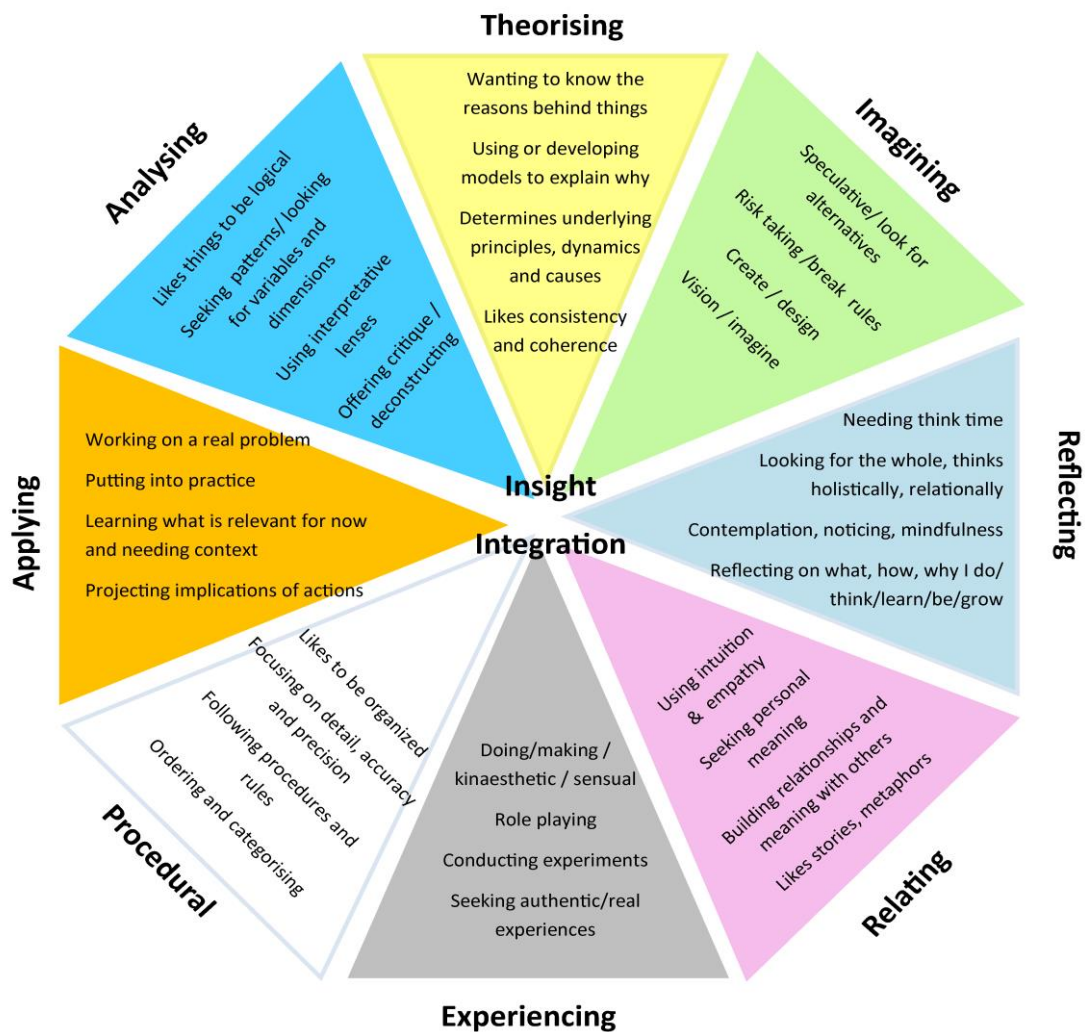


Figure 2.1: Map of dialogic inquiry

The Map can be used to track different ways of thinking over time, through different kinds of experiences (see Chapters 3 and 4 for examples of such use).

Our exploration of the literature so far is based on a number of assumptions about learning that should be made explicit. In making our assumptions more explicit in the following section, we lay the basis for discussing what the literature tells us about knowledge (co) construction.

2.4. Meaning making as a socio-cultural activity

Vygotsky’s theory of human development underpins the dialogic approach to learning (Wells, 1999). According to Vygotsky (1978), learning is social in nature as it first takes place in an inter-mental plane (between individuals) before moving into an intra-mental plane involving individual thought processes. When we interact with others in the inter-mental plane, we share our thought and experiences with others who help to interpret and codify the experiences (Varela, Thompson, & Rosch, 1991). Through these social interactions, we co-construct our meaningful and coherent

understanding of the world. Thus, for our learners to make sense of the world, we need to provide appropriate opportunities for them to interact with one another. Through these interactions, meaning is made with and of the available semiotic resources.

Besides the social environment, Vygotsky (in Wertsch, 1985) held that the material environment a person interacts with, also plays a critical role in the person's development. Adopting a cultural historical lens, Vygotsky argued that the critical elements in human development include the cultural artefacts and practices that surround an individual; as a person learns to use these artefacts and develops the practices, he or she assimilates the experiences of others, including the previous generations (Leont'ev, 1981). In the process, the individual is set on a trajectory of mastering the tools and developing the accepted practices. Seen from this perspective, human beings possess not only biological inheritance, but cultural inheritance; and the participation in communities of practice brings about continuity of the society. That said, however, each situation is unique and different, thus posing challenges to participants of a community; yet at the same time, it provides opportunities for collaborative problem solving that goes beyond the current practices, and might change the cultural tools in the process. Cumulatively, these series of small changes could lead to transformations, which could be considered a "biological-cultural evolution" (Donald, 1991). Learning, from this broader perspective, is the result of continuous participation in social activities that leads to transformation of the identity of an individual who develops expertise in using cultural tools and engaging in practices. Through joint activities with others, different people contribute to developing solutions for new situations, complementing and supporting one another in the interest of achieving the shared goal.

From a social semiotics perspective (Hodge & Kress, 1998), we live in a world surrounded by various forms of signs or symbols, such as a word, picture, gesture, mathematical formula or musical notes. But these signs only have meaning when interpreted by a person. Semiosis is a triadic meaning making process (involving the sign, the object it represents, and the person who interprets it). In other words, we give meaning to what is happening in our physical world as we experience it (Hayakawa & Hayakawa, 1990) and this experience is heavily influenced by culture. Meaning cannot be made without individuals sharing their experiences with others or the felt sensations that the signs represent. Meaning making in a social cultural context is a critical process for understanding the body of knowledge that has been established, as well as for using the semiotic resources of the body of knowledge. This suggests that it is critical to engage learners and provide opportunity for meaning making. Different modes of meaning making could be employed in the coordination and interpretation of joint activities (e.g., talks, gestures), but among them, language is the most important. To Halliday, "language is the essential condition of knowing, the process by which experience becomes knowledge" (1993, p.94). That is, dialogue among participants is a critical component in the learning process.

2.5. Knowledge co-construction

Knowledge 'building' (Scardamalia & Bereiter, 2014) focuses on collaborative inquiry among participants gearing towards construction and improvement of shared knowledge artefacts that advance knowledge collaboratively. It shares many key principles of dialogic teaching and learning discussed so far.

First, in knowledge building, the inquiry is triggered by problems authentic to the participants, often proposed by the participants based on their experience (e.g., educators talking about learning issues among their students). Knowledge building uses authentic issues as a trigger to elicit learners' ideas, experiences and prior knowledge, and seeks to improve their ideas through exposure to multiple perspectives and the use of critical dialogue. An idea can be a question, an observation, an explanation, that utilises or is triggered by the material given, prior experiences and /or knowledge or a sense of dissonance. Using semiotic resources such as a text written by a participant, a question

posed, a provocative statement, a different perspective from that the learner has previously been exposed to, ideas are exposed to critique, inquiry and in this way form the basis for knowledge co-construction. This dialogic process of improving participants' ideas has the goal of improving their disciplinary ways of representing knowledge. The process of idea improvement usually starts with proposal of ideas, comparison of different ideas or clarification of ideas that leads to discussion among participants, and through productive discourse, improvement of ideas. It is a widening spiral as the process of collaborative inquiry usually triggers other new ideas and new questions that lead to further inquiry. Focusing on authentic ideas from the participants has the advantage of developing their epistemic agency, that is, participants take ownership of their knowledge creation effort. When the participants are engaged in inquiry of an authentic problem they raised, they are naturally more motivated and are likely to invest a lot of effort to pursue the answer.

Knowledge co-construction is a dialogic approach that recognizes the central role of dialogue in meaning making. The participants are engaged in productive talk that is not simply agreeing, or confrontational, but exploratory in nature. Exploratory talk (Dawes, Mercer, & Wegerif, 2003) entails active listening, being critical and constructive to others' ideas, treating ideas as tentative and open to improvement, and aiming to collaborate rather than to compete (Walton & Macagno, 2007). Through exploratory talk, participants can build on one another's ideas towards idea improvement, rather than trying to win or to convince others to take a particular view.

The terms knowledge building, and knowledge co-construction, are sometimes used interchangeably. van Alast (2009), however, differentiates knowledge (co)construction from knowledge creation. To van Alast, knowledge construction is rooted in cognitive psychology that focuses on individual cognitive changes, whereas knowledge creation (building) implies a socio-cultural perspective of learning where knowing (Sfard, 1998) is achieved through participation in cultural practices. Knowledge creation also has the additional dimension of group processes in terms of improving the knowledge artefacts (objects) that capture the group learning. **It is this socio-cultural concept of knowledge creation that the authors use when referring to knowledge building or knowledge creation.**

There are various 'tools' available to facilitate knowledge co-construction (creation), inquiry (inclusive of the collection & analysis of evidence) and dialogue, including technology enabled tools such as Knowledge Forum (Scardamalia, 2004). The following section considers how various tools can be used to facilitate pedagogical practices that support dialogical inquiry (the Map of Dialogical Inquiry) and knowledge building.

2.6 Bringing multiple 'tools' together

We argued above, that deep understanding is developed through knowledge co-construction and dialogical inquiry and these processes are integral to each other. Wells (2002) emphasises the need for multiple iterations of dialogue, inquiry and knowledge co-construction, using the metaphor of a spiral to capture this idea. Affording multiple opportunities for learners to progressively build on each coil leads to the development of deep understanding which he labels as theoretical knowing (see Figure 2.2).

Figure 1: The Spiral of Knowing

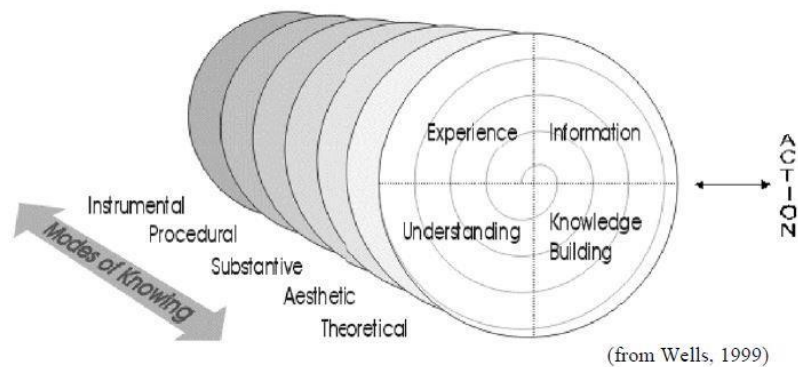


Figure 2.2: The Spiral of Knowing (Wells 2000, p.70)

Wells (2002) explains that each iteration starts with interpretation of past experience to make sense of what is new. What is new is discovered through actions such as, feedback from action, reading, hearing others share their experiences or explanation of, being exposed to different perspectives, or seeing different artefacts, and data gathered from inquiry processes and / or through the reflections of others. These discoveries of 'information' contribute to building knowledge through further dialogue, consideration of forms of evidence (personal or empirical). The process of knowledge building, as discussed above involves active listening, being critical and constructive of others' ideas, treating ideas as tentative and being open to improvement. The process is one of developing shared understanding and responding intramentally and intermentally. Together these processes develop deep understanding and contribute to the next coil or layer of understanding, starting again from experience towards theoretical understanding that the authors label as deeper understanding.

Many of the processes involved in each phase of the spiral of knowing are reflected in the Interaction Analysis Model (IAM) (Gunawardena, Lowe, & Anderson, 1997) shown in Table 2.1. The IAM was adapted by Chai and Tan (2009) to analyse the interactions of a group of educators engaged in a number of professional development courses.

Table 2.1. Interaction Analysis Model (IAM) for Examining Social Construction of Knowledge

Phase 1: Sharing/Comparing of Information	
1a	A statement of observation/opinion/belief/idea or factual information
1b	A statement of agreement from one or more participants
1c	Supporting/corroborating examples provided by one or more participants
1d	Asking and answering questions to clarify details of statement
1e	Definition, description, or identification of a problem
1f	Sharing of reflection from readings/sharing of drafts
Phase 2: Discovery of dissonance/gaps in understanding/inconsistency among ideas, concepts, or statements	
2a	Identifying and stating areas of disagreement/gaps in understanding
2b	Asking/answering questions to explicate the source and extent of disagreement

2c Restating a position and advancing arguments with reference to experience, literature, empirical data, or proposing metaphor/analogy to illustrate point of view

Phase 3: Negotiation of meaning/co-construction of knowledge

3a Negotiation or clarification of the meaning of terms

3b Negotiation of the relative weight to be assigned to types of argument

3c Identification of areas of agreement or overlap among conflicting concepts

3d Proposal and negotiation of new statements/ideas embodying co-construction

3e Proposal of integrating or accommodating metaphors, analogies, and models

3f Proposal of possible solutions to identified problem

Phase 4: Testing and modification of proposed synthesis or co-construction

4a Testing the proposed synthesis against “received fact” as shared by participants

4b Testing against existing cognitive schema or literature

4c Testing against personal experience

4d Testing against formal data collected

4e Testing against contradictory testimony in the literature

Phase 5: Agreement statements/applications of newly constructed knowledge

5a Summarization/synthesis of agreements/outcomes of discussion

5b Applications of new knowledge

5c Metacognitive/reflective statements that illustrate the participants’ changes in understanding or ways of thinking resulting from the interactions

The IAM is listed in a linear fashion but is not necessarily experienced as one phase following another; there is some movement back and forth between the phases. In Figure 2.2 we bring together Wells’ spiral of knowing and the IAM model. The curved arrow (Figure 2.3) indicates dialogue and dialogical inquiry as learners move from experience to information to knowledge building and understanding. Where the spiral of knowing is dynamic with multiple coils or layers of understanding building on each other, the IAM appears static in comparison. As discussed earlier in the Chapter, it is important in dialogical inquiry processes for there to be multiple opportunities to create and build knowledge and develop deep understanding through actions / activities that are centered on authentic problems, issues or tasks.

The spiral of knowing and the IAM are useful for analysing the processes of knowledge building as they step out specific processes learners use in developing deep understanding.

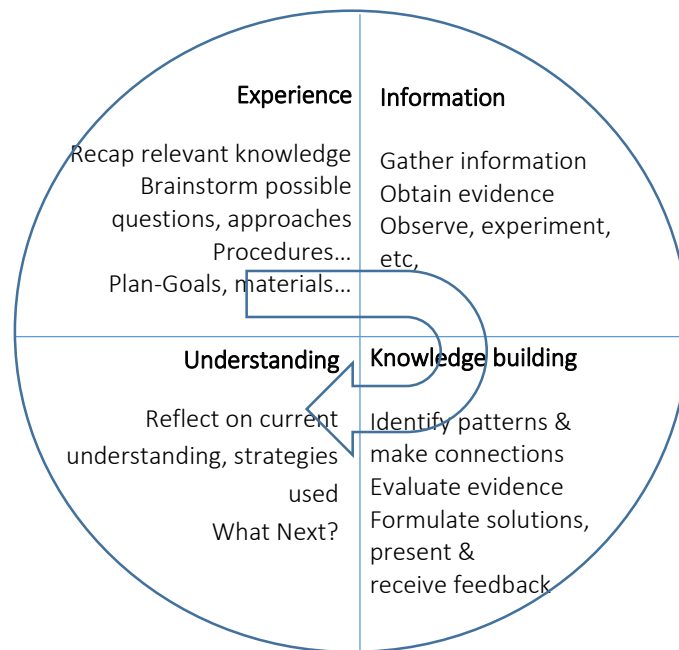


Figure 2.3: The spiral of understanding and the IAM

In this project, the Knowledge Forum (Scardamalia, 2004) (see Chapter 4 for example of the Knowledge Forum in use) is used in one of the cases; it is an example of a tech-enabled tool of knowledge creation / knowledge building. Scardamalia (2004) describes the Knowledge Forum as “a multimedia community knowledge space”, providing a record of group advances in their [learners’] knowledge building. Notes and views in the Forum support teamwork and collaborative design, with the latter providing different perspectives on information. The forum enables all participants to develop a common discourse as ideas and goals emerge through the use of scaffolded knowledge building processes. Core to the Forum is ‘rise above and improvable ideas’.

“Rise above” notes play a pivotal role in idea improvement. “Rise above” is refers to the most constructive way of dealing with divergent or opposing ideas is not to decide on a winner or loser or a compromised position but rather to create a new idea that preserves the value of the competing ideas while “rising above” their incompatibilities. In the simplest cases, the rise-above may be simply a summary or distillation; in the most compelling cases, the rise-above presents a new idea that all the participants can recognize as an advance over their previous ideas. (Scardamalia, 2004, p.7)

In these ways the Knowledge Forum directly contributes to deep understanding. An important aspect of developing deep understanding is being comfortable with different ways of thinking, views and perspectives which can be provided through the use of the Map of Dialogical Inquiry. The Map of dialogic inquiry (discussed earlier in the Chapter) offers a useful tool to make visible the extent to which different ways of thinking are being used. It contributes to meta-cognitive awareness, liberating users from well-trodden ways of thinking through making their thinking visible and scaffolding alternative ways of thinking.

2.7. Conclusion

This chapter introduces the reader to the range of conceptual tools used in this project; namely the importance of using authentic learning activities, the Map of Dialogical Inquiry; knowledge building/creation, the IAM (as an analytical tool) and the Knowledge Forum. Wells’ (1999) spiral of

knowing offers a logical conceptual frame to bring these different concepts together. These concepts provide insights into the processes of developing deep understanding, offer tools for educators to use in developing learners' meta-cognitive capabilities and in the case of the IAM offers researchers an analytical tool for analysing aspects of some of these processes.

Dialogical inquiry and knowledge building processes have deep implications for educators and for the design of curriculum and learning. These processes require more than building in authentic problems, issues and tasks, more than opportunities for dialogue and exposure to multiple perspectives. These important aspects of dialogical inquiry and knowledge building do not alone make for dialogical inquiry and knowledge building. Rather, they must be accompanied by a genuine belief on the part of the educator that learners are NOT blank slates, but are active meaning makers, that learning is a socially constructed and contextualised process and that the educator is only one authoritative voice, along with learners, other resources, tools and social relations. This required shift in the balance of power takes place not only for the educator, but also for learners. Learners used to taking passive roles as they experience front-end loading pedagogies, need to become comfortable with feeling uncomfortable in making sense of multiple voices and perspectives, need to be active contributors and sense-makers and to develop meta-cognitive strategies to continue to negotiate their way towards deep understanding that impacts on their practice. In short, learners need to become agentic in their learning.

The following two chapters analyse the data from the two Masters courses, described in Chapter 1.

3. Workplace Learning & Performance

This course takes place half way through a Master's programme aimed at professionals involved in some form of educative role (e.g. lecturers, teachers, nurse educators, HR managers, trainers, team leaders and managers in industries as diverse as marine, logistics, armed forces, retail). It is a mid-semester course, meaning that equivalent face-to-face hours for a whole semester take place within a six-week period.

Students are required to identify an authentic problem in their workplace, inquire into this problem to deepen their understanding of it through gathering and analysing evidence in their workplace and develop a learning intervention. Students are individually supported in the selection and writing up of their workplace issue. As a class and in their self-designated groups, time is spent discussing who the stakeholders are and thus who they would interview (typically 4-6 interviews given the short time frame), scaffolding the crafting of interview questions, developing an appreciation of the ethics involved in such activities and in ways of analysing their data. The first summative assignment is peer assessed and feedback given before the final submission of this assignment which is on writing up the issue and analysing the affordances (enablers and constraints) for learning in their organisation. These assignments are returned quickly by the educator so that students can incorporate and improve in their final assignment. The final assignment includes all stages of the inquiry process: the problem, the analysis of affordances for learning (here theory and practice are brought together), stakeholder analysis, the learning interventions with a rationale based on the literature on why the selected learning interventions (here also theory and practice are woven together), a timeline for the interventions and an evaluation plan. In addition, learners write a brief reflection of their learning journey. Students are also assessed on their participation and engagement in knowledge co-construction and inquiry processes. Throughout the course, students are actively engaged in dialogue as they make meaning, construct and co-construct knowledge and engage in inquiry processes.

In the first week, students are given access to a workplace learning MOOC developed by the educator that provides a simple overview of workplace learning and of the major concepts in the course. Students also experience the ecology room (See Figure 3.1) where they move around 12 different stations at their own pace. Each station introduces different aspects of workplace learning. In these ways, students are given an overview of the concepts and then over the course are re-introduced to concepts at a deeper level and in ways that require them to actively engage with the materials to develop their own interpretations and understandings, guided by some framing of the concepts in short 10 minute 'lectures'. Typical sessions include opportunities for students to ask questions and clarify concepts with each other and share with the group, short 10-15 lecture format, followed by group discussions to work through issues and activities where learners physically place themselves in a space that represents a belief or perspective.

This chapter uses the research questions to structure the presentation of the findings. The first section, 'Learners' perception of the value of dialogical teaching and learning' is followed by, 'Moving from didactic to dialogical approaches'. In the following section we explore the challenges students experienced as they grappled with different responsibilities for their learning. 'Learners' awareness of their own inquiry processes' follows and the final section, 'Knowledge co-construction' is followed by the conclusion which touches on the implications for teaching and learning.



Figure 3.1: Ecology room

3.1. Learners' perception of the value of dialogical teaching and learning

It definitely challenges us to think more about the issues that were presented to us and as compared to, you are doing it alone, it's like the acquisition metaphor. You do it alone, you try to think about it, you try to read books. But through participatory, in a group, the exchanges, the kind of views that we share and whether we agree or disagree, it actually helps us to really...how should I say? *Think about the questions, look at it from a different perspective and try to also understand from your peers their other angle on the way they see the issues.*

And that actually expands our so-called *understanding of that particular issue* that we are talking about. Because without that, you will only have your own perceptions and your own understanding. With others' inputs, that *helps expand your ability to understand* the subject better. (Bernard)

This quote from Bernard captures what most students valued about dialogical teaching and learning, The italicised phrases place an emphasis on the contribution of dialogical teaching and learning to improving understanding through hearing other perspectives, engaging in the negotiation of meaning and knowledge co-construction – “whether we agree or disagree” – and assists participants to “think” deeper, “expand[ing] their ability to understand”.

Learners found the many interactions both within groups and in whole class discussions “very enriching” (Holly), and “useful” (Susan) because of exposure to varied perspectives, sharing of experiences, ideas and questions. Participants came to value the importance of dialogue and the inquiry processes as implicit in the learning process, indicated in Nathaniel and Oscar’s observations:

It's good if you can reflect, if not then everything just go to lost. So I think that is something which I can work on as well. So if you ask me I will have more deep understanding... (Nathaniel)

Means that there must be dialogues, because through the dialogues then one know where, what she, he or she don't know, and what is the gap, and then she, he or she go and source and looking for it, then try to cover back the gap. (Oscar)

Through dialogue, learners uncover what they 'know' and what they do not, or establish the limits of current understandings. This then encourages or motivates them to seek sources that they have not yet accessed. Participants are actively engaged in a process of filtering through prior experience, knowing, and negotiation of meaning (Hung, Tan, & Chen, 2005, p.38).

Ideas get “crystallised” (Melvin) through hearing different ideas and perspectives. One student commented that, “sometimes when they ask questions or when they discuss, you actually can draw a different conclusion from what you usually thought. Yeah because sometimes you think it's only like that but it can be more” (Nathaniel). This expansion of understanding of concepts and possibilities – “sometimes you think it's only like that but it can be more” – becomes a marker for shifts in beliefs, in the surfacing and naming of assumptions that may have confined understanding and applications.

Another, surprising aspect was that peer sharing and discussion developed deeper understanding of what was covered in earlier courses in the programme. “Previously... I do not have a deep understanding of it.” (Bernard) For example an earlier course covered the concept and process of training needs analysis. Through the inquiry process used in the Workplace Learning and Performance course, students widened their understanding, commenting that there are multiple ways of doing a needs analysis, “so you can move beyond that; I think that's very useful.” (Daniel)

Immersion is an important starting point in developing understanding; understanding *evolves* as patterns of internal mental dialogue transform, contributing to higher forms of cognition (Ferryhough, 2008). This restructuring of aspects of perspectives or orientation involves internal dialogue with self that has within it the voices of others (Bakhtin, 1986). In this quote, Susan is reporting on some of this internal dialogue, where she discovers that what she thought she understood, she did in fact not understand, leading to a series of questions, then connections to previous patterns of understanding. Similarly, for Odell below. Odell actively seeks alternative perspectives, considers others' perspectives and evaluates these in terms of his belief at a particular point in time – “which perspective is good for me”.

I think that, I learn better when...when I...when I think about the idea first, and somebody starts talking about it. So it will get, in a way gives me a...a in a different perspective. From A's point of view, he thinks that this theory says this, this, this. But from my point of view, I say, the theory thinks X, Y and Z. So it's getting...I would say bridging whether which perspective is good for me. I would say. I might think that X, Y, Z is correct, but after hearing her, from another classmate, I might think that oh, X, Y is correct, maybe Z was wrong, and some of her ideas were correct. So the dialogue between the class could have contributed some ideas to, to what I've been thinking of. (Odell)

Odell is describing his process of internalisation of dialogue, which involves self-negotiation and evaluation. Different perspectives contribute to a restructuring of cognition to enable accommodation of multiple perspectives on a topic (Fernyhough, 2008). Odell also noted the importance of purposeful multiple occurrences of dialogue in order to build the ability to propose, explore and evaluate alternative ideas, explanations and problem solutions to construct a satisfactory outcome together (Bereiter & Scardamalia, 2014).

Yeah, so it gives me a whole spectrum of different perspectives and angles when looking at the same thing. So that kind of really adds a lot of value. (Odell)

Xavier expresses a similar experience. That the dialogue “adds a lot of value” and the example of the differences in the mind maps suggests support for the strong claims in the literature that social interaction is necessary to establish new structures of thought (Fernyhough, 2008). Xavier goes on to comment that,

And they also raise their doubts at the same time, not just their perspectives, but what they are lacking and what they are unsure of. From there I can also learn. Which [another student] actually kind of rightly point out. So many articles arh, I think they might be actually using different terms arh, but it might be actually the same thing. I have this same thought in my mind... (Xavier)

Here students are becoming familiar with the language of the field of study, realising that the subject of workplace learning can be described in different ways. The exploration of language has the power to create more complex forms of thought. As Oscar expresses, “the more you converse, the more you talk, the more you gain... through the discussion we actually gain a better knowledge of this”. The quality of the dialogue is important in improving thinking (Wegerif, 2007). Hearing and using the language is a process of testing it out, getting feedback from peers, educator, the class activities and their own actions and internal dialogue. Such processes designed into the dialogical teaching process assist “transitions” in understandings (Wertsch, 1985, p.167).

Learners expressed that the dialogical teaching and learning approach contributed to:

- deepening understanding;
- expanding understandings;
- developing sharing across and within groups;
- exposure to a diverse range of perspectives;
- becoming more questioning and developing an ability to critique;

- becoming aware of their evaluation of different perspectives, and the processes involved; and
- valuing hearing different contributions from colleagues, and what it means for their own understanding.

3.2. Moving from monologic teaching experiences to dialogical teaching and learning

Particularly in the first two to three weeks of this condensed course which took place over six weeks, meeting two to three times per week, students struggled with the very different experience that dialogical teaching and learning involved them in. Initial discomfort lasted longer for some than others, as they learnt to take responsibility for their own learning and growth. At the core of the struggle seemed to be what they perceived as a lack of structure, and no provision of clear answers from the authoritative voice of an educator. Additionally, beyond the usual challenges of lack of time to read and digest material in a condensed timeframe of a between semester course, there was the extra challenge of applying theory to practice. Students' struggle led the educators to modify the last sessions, by spending some considerable time in working this challenge through with the class. A further challenge was the writing up of the report. As one student said, it was "a little bit of a hybrid" (Xavier) combining report writing format and academic writing where analysis and planning had to be supported by critical appraisal of theory.

Learners' journey involved shifting from being a relatively passive recipient in previous courses in this Masters' programme, to becoming an active agent, as described by Holly and Melvin.

Not so much of a top-down approach. It's like the facilitators (of the course), they basically, they don't just come in and they start pouring information into our heads. Maybe for some of us they are not so used to this kind of approach they may find it threatening.... (Holly)

for ... lecturers [in the previous courses and other programmes], they are a bit more direct. This is what you need to know, this is what you need to put in your assignment. (Melvin)

Shifting from a highly structured, educator centred approach, caused confusion for some:

Like the last lesson [in week 3 of the course] that we had, unpacking some of the learning theories, I don't really understand what are we trying to drive at. But unpacking the learning theories, are we supposed to have a critical insight on what the theories meant? Or because different people will have different interpretations, is that the way or the approach that they want us to unpack, or should they tell us what they perceive this particular theory espoused and share with us? Yeah, so I don't know. I don't see much, yeah, helping us understand what the main theories espouse or the main focus. Or rather base it on our own interpretation, which I feel very confusing because many people, discussions, here and there but...leading here and there, but I don't know exactly...yeah, eventually what it leads to. (Doris)

Confusion over instructions and the goal of the activities is one thing, and always an area for improvement on the part of the educator. So, certainly this was a potential issue, for this student at least, if not also for others. This aside, the comment that, "I don't see much, yeah, helping us understand what the main theories *espouse* or the main focus", indicates that Doris is looking for a definitive answer, rather than expecting to engage in a process of interpretation and exploration of application. Not surprising then that she expresses confusion evidenced in her statement that, "Or rather base it on our own interpretation, which I feel very confusing because many people, discussions, here and there but...leading here and there, but I don't know exactly...yeah, eventually

what it leads to.” Another learner commented, “That, initially, it’s very confusing in the beginning, I can’t learn anything at all, except that I have to go back and read.” (Olivia). Confusion is sometimes considered due to a lack of structure and direction – “there’s no clear structure so there’s no clear direction” (Ursula). Multiple occurrences of dialogue are important, allowing learners to progress their discourse so that they propose, explore and evaluate alternative ideas, explanations and problem solutions and, together, to construct the most satisfactory outcome of which they are capable (Wells, 2002). The struggle for learners is not surprising given the very different pedagogical approaches they had experienced in previous courses of the programme and in previous formal learning experiences. This suggests a need to scaffold the different experiences for learners and gradually hand over the responsibility for learning to them.

3.3. Changes in roles and responsibilities

Part of the process of scaffolding the handing over of responsibility for learning to learner is to understand their different roles and the different role of the educator. In other words, the division of labour is different from more traditional approaches. Olivia points out the difference between the role of the educator and learners:

Okay, previously, I had previous courses with [names of 3 lecturers in previous courses in the Masters’ programme]. So their style is they try a lot of social constructivism, but then it kind of fail, because my classmates are always waiting to be spoon fed. And they’ll always email for things in that. And at the end of the day, the lecturer will give in. [laugh] Yeah, so [lecturer of WPL&P course] don’t give in. So she actually emphasise a lot on the reading, the importance of it, and we’ll actually does a lot of group work. The previous sessions, all the questions, all the things that she actually raised, in the end it’s a group discussion. It’s never a one to one thing, till you really have problem, then she will see you one to one. It’s always answered there and then at the table with your group members... It is a lot more on self-directed. Is this person did not really read, he’s not going to learn anything, yeah. He can learn things, from the friends, from the group members, which don’t know whether they read or not. If you trust them, then so be it. [laugh] (Olivia)

Odell compares his experiences in WPL and Performance with previous courses in the programme.

You can see more information coming from the peers, I find. Even more than the...I would say, than the usual courses [in the Masters programme]. Although there are, because the [programme] structure, from the way I see it, is I teach you, I tell you, A is, this is...this is what...direct instruction is about, this is how it is, who does it, okay let’s have a case study, let’s have group discussion to talk about this case study. Whereas over here [WPL and Performance course], is about you share between your peers, and try to come to a consensus. Sometimes you are actually gathering in groups, you...you get groups that are...tuned towards your workplace learning issue, which helps quite a bit. (Odell)

Odell highlights the different role expected of learners in the WPL and Performance course – “is about you share between your peers, and try to come to a consensus.” The need for learners to take charge of their own learning is inherent in the dialogical teaching and learning process. This difference in the division of labour of both learners and educators was a recurring theme in the interviews. Xavier, for example, notes that,

I think there’s tons of activities that’s going on, not that the previous [courses in the Master’s programme] doesn’t. But this [WPL&P course] you can see that there’s a lot of ownership from the students to actually run the activities themselves. You can see it, based on observation

arh, trainers seem to actually kind of scaffold off during the activities. You don't really feel their presence there unless you need them. (Xavier)

The shifts in the division of labour require learners to take responsibility for strategising the learning process, a role often taken by educators, to the point where learners do not develop these capabilities in the learning process. Olivia's observed that, "The teaching style...I think the challenges is, learners need to be very self-directed, if you don't take charge of your own learning, you don't learn much at all. You rely a lot, heavily on other group members" (Olivia). To be a self-directed learner requires strategising and planning, an additional load for students who have become comfortable in a role of being passive learners.

Others settled readily into the dialogical inquiry process, happily taking up the opportunities for taking responsibility for their own learning. Melvin comments that the process,

Helps me form my own...my own opinion on things. There's no one idea I've got to subscribe to, so that's good. And also I think if you can bring your point across, then people can agree or disagree with you, rather than hold to a certain frame or...definition of things.

The realisation that "there's no one idea I've got to subscribe to" marks both a shift in understanding his role as a learner, and also a shift in power relations, where the learner, in this instance, Melvin, recognises that permission is given and he exercises his agency in developing his own opinion. He has a stance that is "a willingness to wonder, to ask questions and to attempt to answer those questions through the collection of relevant evidence by various means, both empirical and library-based, and to present the findings to one's peers for critical review and improvement" (Wells, 2002, p.33). Una describes the process as getting lost, then getting everything back into place again.

The challenge? I think the challenge is when the discussion goes on to a bigger scope and then it makes you kind of think and most of time we will get lost somewhere trying to internalize a bit to get everything back into place again, based on my own understanding. (Una)

Another difference in roles is that the authoritative voice is not just that of the educator, rather it is distributed amongst the readings, the educator, through the activities and the group dialogue. Odell commented on the importance of doing the readings:

I would say you...for, for me it'll be very, you need to be very prepared when you come here. Whereas for conventional [the University] courses, you just go in with a blank slate of mind, you just say okay, here, let's say... [lecturer in earlier course in the Masters' programme] was talking about this, this, this. Let me go back and read more about this based on her understanding. (Odell)

Participants in the dialogical inquiry teaching and learning process can be expected to experience uncertainty and lack of clarity. Being uncomfortable is part of the process of inquiry and constructing knowledge. The trick is to learn to be comfortable with being uncomfortable as more stable knowledge evolves and emerges by understanding the process of inquiry and knowledge co-construction.

In summary, shifting from a didactic approach of teaching to dialogical inquiry requires important shifts in the division of labour between educator and participant. The educator moves from positioning themselves as the only or major authoritative voice and the one who has the final word on the matter (it is their interpretation that will be looked to, to be reproduced in various ways in the assessment) to being a resource, a prompt, a facilitator and someone who supports the knowledge co-construction process. For learners in the dialogical inquiry process, it requires a shift from being a passive recipient of knowledge from an authoritative voice(s) to an active agent engaged in

knowledge co-construction, building language not only of the field of study, but of the processes of negotiating meaning and inquiry.

3.4. Learners' awareness of their own dialogical inquiry processes

The map of dialogical inquiry is a meta-cognitive tool that can be used to show: a) growing awareness and b) growth in the use of the eight aspects of thinking in the map, from a few to many, and the extent of this growth. Participants' maps of dialogical inquiry, along with their reflections in the final section of their assignments and interviews with participants are used to address the question of how learners' develop awareness of their inquiry processes.

This section will begin with the statistical analysis of the maps the 17 participants who submitted at least two inquiry maps (see Figure 3.3 for an example) during the course. The mean scores of these selected maps were compared with the class showing a difference ranging between of 0.03 to 0.25. As these differences were small, the scores of these 17 participants were analysed to compare their mean scores of the first map with their scores of the last map. A summary of these scores can be found in Appendix 1. The mean scores of the first and last inquiry maps were analysed with the dependent t-tests. This analysis was conducted to determine whether the observed increases in scores between the first and final inquiry maps were statistically significant (i.e. instead of by chance). A summary of this analysis can be found in Table 3.1.

Next, a repeated measures analysis of variance (RM-ANOVA) with a Greenhouse-Geisser correction was conducted for the inquiry domains that were found to have significant increases in the dependent t-tests as show in in Table 3.1. This series of RM-ANOVA was conducted to determine whether the observed increases in scores from the first inquiry map and in the later inquiry maps were statistically significant (i.e. instead of by chance).

Table 3.1: Summary of Dependent t-test of First and Last Inquiry Map Scores, indicating significance

Inquiry Domain	Descriptor	Increases in Scores	t	df	Sig. (2-tailed)
Theorizing	Participants were observing more theorizing in their inquiry process during the later part of the course; this would include them wanting to know reasons behind things, using or developing models to explain why, seeking to understand or determine underlying principles, and seeking coherency.	2.35 ± 1.77 points	-5.49	16	0.0000*
Imagining	Participants were engaging in more imaginative activities in their inquiry process during the later part of the course; this would include them speculating and playing around with about ideas, taking risks and breaking rules, being creative and involved in designing, looking for alternatives, exploring new possibilities, and imagining other perspectives or scenarios.	Not significant	-1.59	16	0.1318

Reflecting	Participants were reflecting more in their inquiry process throughout the course; this would include them reflecting on their learning process, engaging in big picture and systems thinking, including other ways of thinking, seeking to reveal and relate to values, considering paradigms and cultures, and using metacognitive processes	2.71 ± 1.53 points	-7.28	16	0.0000*
Relating	Participants were relating more in their inquiry process during the later part of the course; this would include them using intuition and empathy, seeking personal meaning, sharing their own experiences, building relationships and meaning with their peers, and also expressing their feelings, opinions, and values.	1.88 ± 1.11 points	-6.98	16	0.0000*
Experiencing	Participants were experiencing more in their inquiry process during the later part of the course; this includes them observing and perceiving, doing and making, engaging in kinaesthetic experiences, and seeking authentic experiences	1.41 ± 1.06 points	-5.47	16	0.0001*
Procedural	Participants were engaging in more procedural activities in their inquiry process during the later part of the course; this would include them focusing on details, following procedures, working with clear rules, ordering and categorising, defining terminology, and focusing on accuracy and precision.	Not significant	-1.60	16	0.1302
Applying	Participants were relating more in their inquiry process throughout course; this would include them putting into practice what they are learning, asking "What I would do?" questions, planning and thinking strategically, acting ethically, projecting implications or outcomes, and learning what is relevant for now and with the need for context.	2.82 ± 1.38 points	-8.44	16	0.0000*
Analyzing	Participants were relating more in their inquiry process throughout course; this would include them engaging in logic (e.g. thinking, peer-discussion), using analytical techniques (e.g. in solving problems), seeking patterns, similarities and differences, thinking about the advantages and disadvantages of solutions, offering critique, and also deconstructing and interpreting ideas.	2.47 ± 1.55 points	-6.59	16	0.0000*

* indicates a significant increase for this Inquiry Aspect

Six of the eight aspects of the map showed significant increases (see Figure 3.2 graphically illustrating changes over time). As learners grew in their ability to more holistically use different aspects of the map, build knowledge through readings, dialogue, class activities (that included lecture style delivery of 10-15 minutes, once or twice per session) and engage meaningfully in dialogue, so the scores increased. Meaningful engagement in dialogue was most notable in the group transcripts. In the earlier weeks, some groups spent considerable time sharing their negative experience of being required to be self-directed. However, as the weeks progressed, there was a marked difference in their focus and sharing.

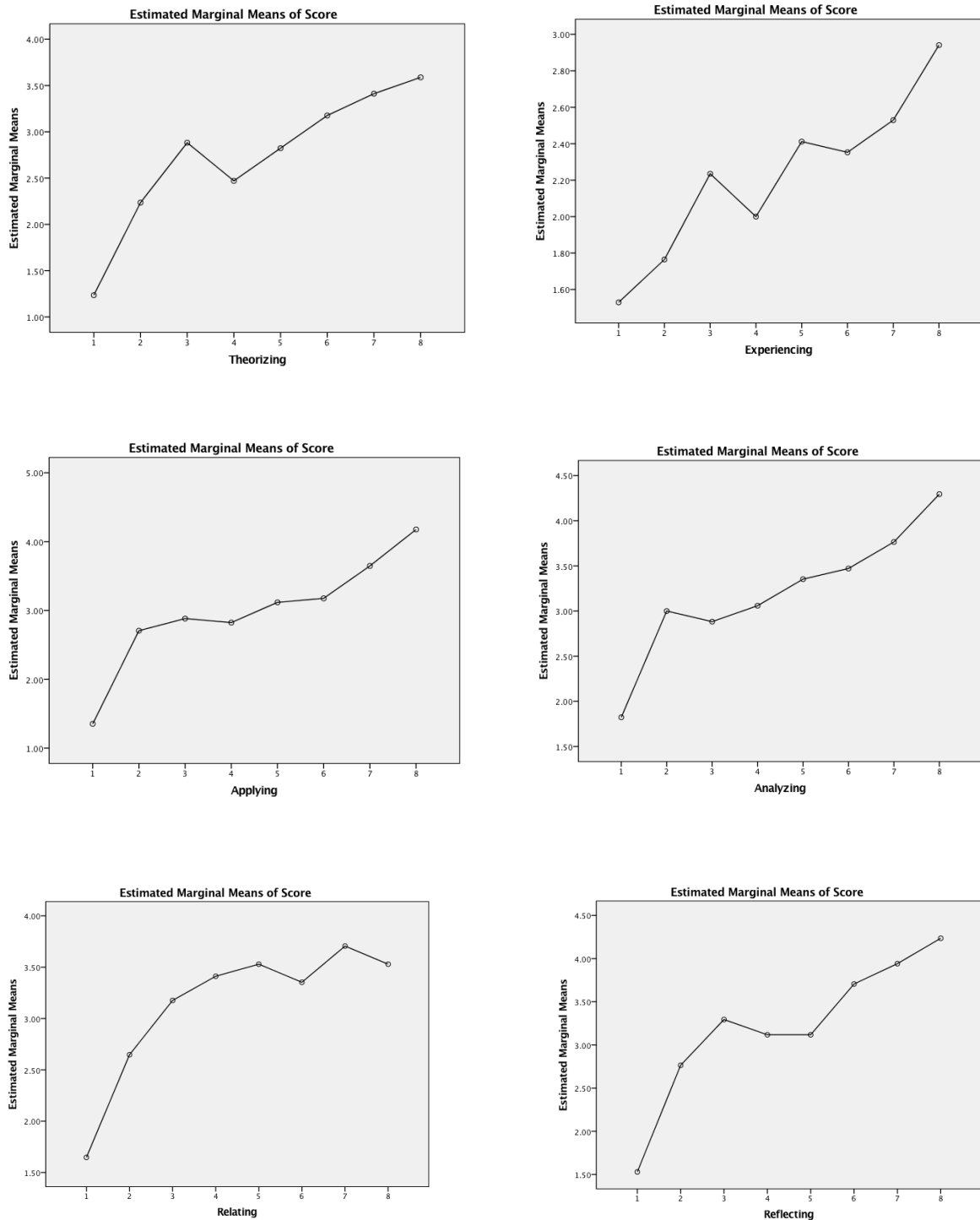


Figure 3.2: Changes over time in significant aspects of dialogical inquiry

Of the aspects that showed significant increases, all but *analysing* showed a dip in week 4; *relating* dipped in week 6, and for *reflecting* in week 5. The marginal means however did not change from the previous week. The topic in week 4 was stakeholder analysis and engagement, delivered through a much longer lecture than usual and involving whole class discussion. This supports the argument that engagement in group activities where learners are responsible for constructing knowledge is a powerful tool for developing higher cognitive thinking and deep understanding. In week 5 students were involved in assessing their own and each other's brief write up against the assessment criteria and giving feedback to each other. The unanimous conclusion was that they were weak in use of literature. As this latter activity involves *analysing*, it is not surprising that the *analysing* score continues to climb. However, it is interesting that the marginal means of *reflecting* remained the same as the previous week. This suggests it may be necessary to make explicit the need for *reflecting* as part of peer review.

The specifics of how learners develop awareness of their inquiry processes can be better understood by examining the maps of individuals. In his reflection, Ulysses comments that:

Another interesting discovery of my learning journey is my inquiry learning method... I always thought that imagining is my key learning method. However, from the trend of my inquiry map, my learning style has changed from imagining to more applying, analysing and procedural in the later stage. This is a very good awareness call for me. Now, I know why I also have this repeated "frustrated and stuck" feeling when doing academic assignments. I always started with a lot of ideas but subsequently I will do more analysing and start searching a model or a procedural way to complete the assignment. In the process of searching the model, I lost my imagery to be flexible and creativity in completing the assignments. Therefore, with this awareness, I will consciously apply more imagining learning style to take risk and be more creative in approaching my future assignments (Ulysses)

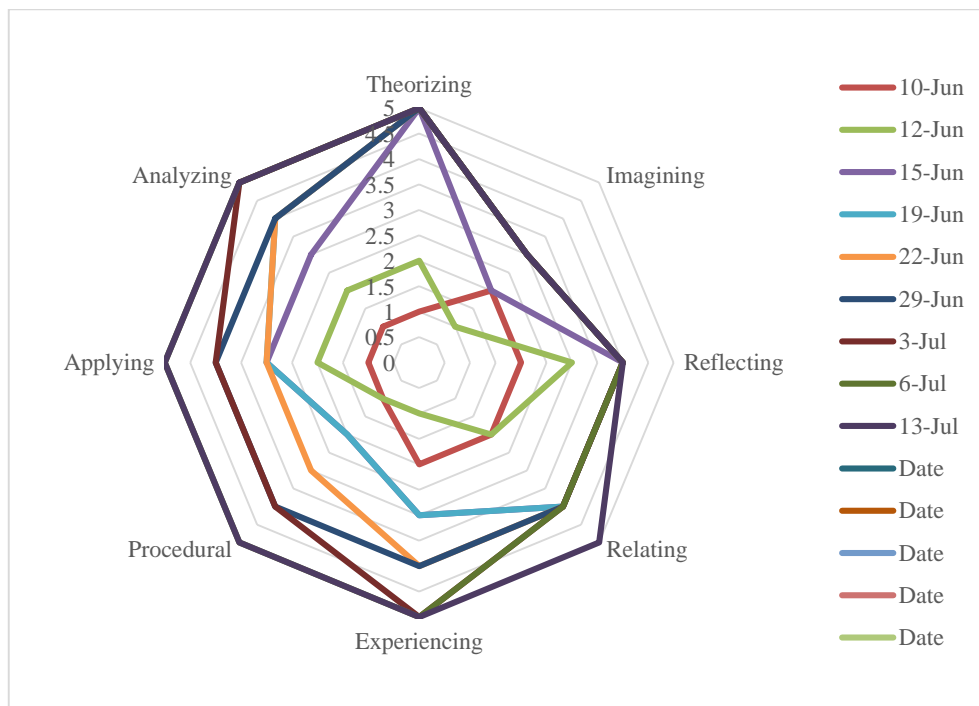


Figure 3.3: Ulysses' map of inquiry

Ulysses’s map shows a skewing towards the left side of the map with lesser scores for imagining and reflecting. The use of the map enabled Ulysses to ‘see’ what was happening and why he often felt ‘stuck’ with academic assessments. This is an important discovery for Ulysses, and in fact in the following course in the Master’s programme, he contacted the WPL&P educator for advice on this issue.

Holly, in her interview, clearly notes the usefulness of the map of inquiry in developing her awareness of the dialogical inquiry process.

So it sort of expands you know, so I guess it's useful for my own reflection, my own progress. How I look at it, how I actually learned over time. And actually yeah I'm able to do that, you know be able to analyse and theorise, you know things like that based on what I have learned. The models or theories, being able to apply them. (Holly)

Holly’s comment that “And actually yeah I'm able to do that, you know be able to analyse and theorise,” is an expression of surprise. This was explicit in her tone of voice and of course in her map (figure 3.4). In the first few entries, theorising was low and for the first session was zero. However, over the time of the course, she became strong in these aspects, developing an awareness of herself as someone who does analyse and theorise, important for knowledge building. Such awareness is part of meta-cognition and a growing identity as a learner with particular strengths.

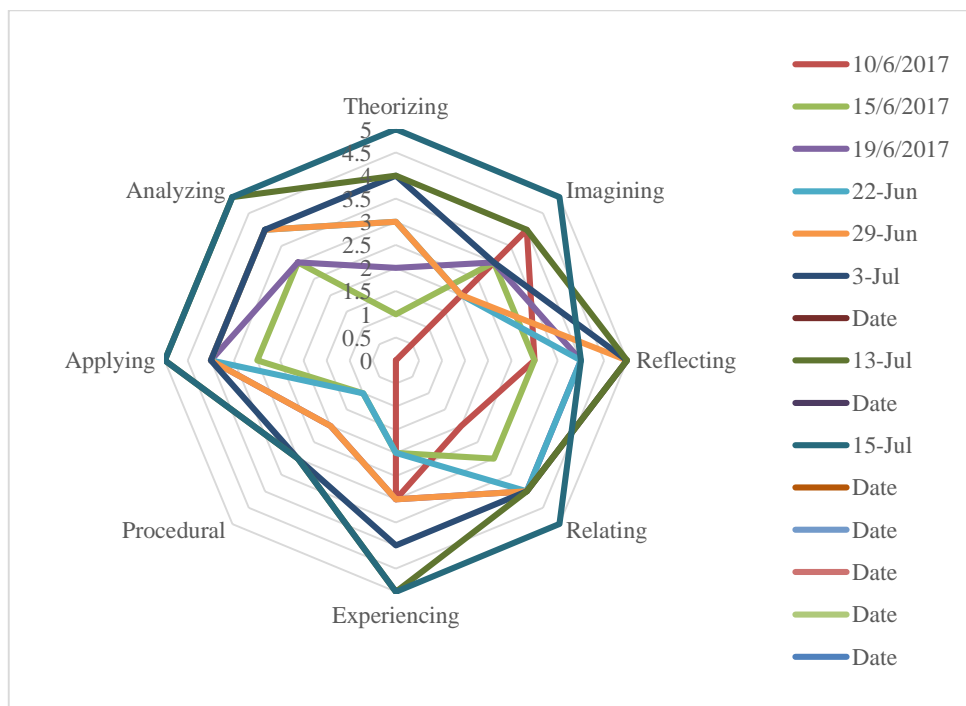


Figure 3.4: Holly’s map of inquiry

In his reflection, Oscar made observations about the growth in his awareness of the dialogical inquiry process.

As seen in my map of inquiry, my journey started with a small area near to the core of the map. As the time passed with more conversations with my lecturers and fellow classmates, I began to pick up more perspectives about workplace learning and how individuals prefer to learn according to their inquiry profile. Knowing my inquiry profile will give me agency and control throughout the process of learning. As observed in the map of inquiry where there are five main areas where my scores are higher, I am the kind of profile of learner who learns through

kinesthetically or authentic experiences (Experiencing), needs to understand the reasons and principles behind things (Theorising), analyse the patterns and seek for logic (Analysing) and put whatever learned into practice by working on an authentic workplace problem (Applying). Last but not least, I also need time after every segment or activity to reflect on what I have learned so far and think through the whole learning holistically. (Oscar)

A small number (n=3) of students whose focus in their reflection in the final assessment was on a description of what was new content for them, as opposed to the awareness of their inquiry process and their journey, tended to have limited experience and access to the language of reflection. Overall, the three students concerned had lesser capability in their command of written language. Language is a key resource of the dialogical inquiry process; it is a primary resource for learning. These students require a different scaffolding to enable them to reach the standards explicit in the assessment criteria – which were used by participants to both self-assess and assess the work of their peers. Metacognitive awareness and the language to describe it seems to be important in developing higher order thinking, inquiry and in internalising the social dialogical process into new planes of mental activity. This is analysed further in the following section on reflecting and reflections.

3.4.1. Reflecting and reflections

We categorised learners' reflections into four subgroups: descriptive, partially reflective, holistically reflective and metacognitive. The criteria for categorization were derived from the definition of the 'Reflecting' aspect of map of inquiry (Bound, 2010) as well as the criteria used to mark the reflection portion of the assignment. From the descriptive level to the reflective & aware level, the level of reflecting increases and the depth of reflecting increases as well. The descriptions for the different type of reflection can be as seen in table 3.2.

Table 3.2: Description for Reflection Types

Type of Reflection	Description
Descriptive	Descriptive rather than reflective piece with little or no explanation / analysis of their learning journey or what has been learnt
Partially Reflective	<p>Focus on two or less of the following</p> <ol style="list-style-type: none"> 1. Awareness of own assumptions and/or how one learns 2. Reflecting on own assumptions (why it did/did not change) and/or how one learns 3. Including other ways of thinking (i.e. taking peer's perspectives, identifying limitations) 4. Seeking to reveal and relate to values, paradigms & culture
Holistically Reflective	<p>Focus on more than two of the following</p> <ol style="list-style-type: none"> 1. Awareness of own assumptions and/or how one learns 2. Reflecting on own assumptions (why it did/did not change) and/or how one learns 3. Including other ways of thinking (i.e. taking peer's perspectives, identifying limitations) 4. Seeking to reveal and relate to values, paradigms & culture

Meta-cognitive	Focus on more than two of the following and must include point 5 :
	1. Awareness of own assumptions and/or how one learns
	2. Reflecting on own assumptions (why it did/did not change) and/or how one learns
	3. Including other ways of thinking (i.e. taking peer's perspectives, identifying limitations)
	4. Seeking to reveal and relate to values, paradigms & culture
	5. Awareness of metacognitive processes and meta-thinking

Figure 3.5 indicates there is a general upwards trend where scores increase with the depth of their reflection piece. Specifically, students with descriptive level reflections all had scores below 50 with little or no reflection in their work and only provided brief descriptions of what it was like taking the course. Students with partially reflective pieces had scores ranging from 51 to 63 while students with holistically reflective pieces had course scores ranging from 63 to 84. Those with metacognitive reflections generally scored 85 and above with the exception of CCK and CLE who scored 67 and 78 respectively.

Students with metacognitive reflections, for the most part, scored better for the course, likely due to the ability to use metacognitive processes in their learning and/or dialogical inquiry process. Metacognition can be widely divided into cognitive knowledge and cognitive regulation (Stack & Bound, 2012). Many of these metacognitive reflections involved understanding themselves as a learner and how that affects their performance. A common point discussed was recognising their dominant ways of thinking in the map of inquiry and how it influences their learning.

Neil incorporated other components of cognitive knowledge and cognitive regulation (meta-cognition) in his reflection. Specifically, in the discussion of the data collection process, Neil recognised his way of thinking regarding the data collected and subsequently evaluated his thought process, resulting in his data analysis yielding new information inconsistent with his previous mental schema. This reflective process of considering, what does this mean, appears to contribute to deeper understanding of how to apply theory to practice. Not surprising that with such insights, he scored higher than many other students for the course.

Type of Reflections & Module Scores

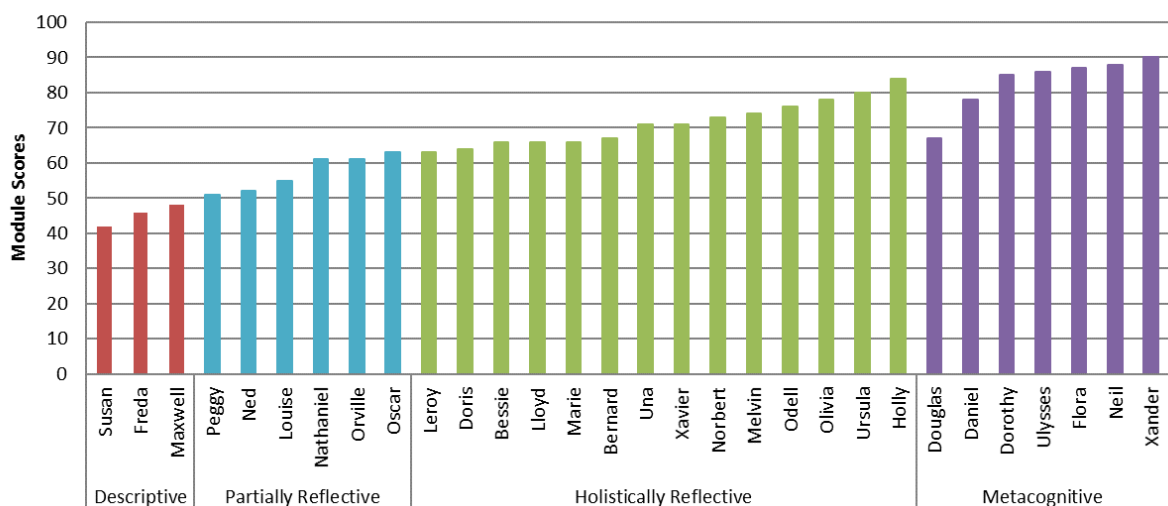


Figure 3.5. Relationship between Reflection Types & Course Scores

As part of the dialogical inquiry process, reflection appears to play an important role in meta-cognition and also in the construction of knowledge.

3.5. Co-construction of knowledge

Students completed two concept maps, one early in the course involving sharing and critique from peers, and the other as part of submitting their final assignment. These concept maps, along with student reflections provide illustrations of the processes of knowledge (co) construction. In his reflection, Ulysses wrote:

It was a very interesting journey to me. [In the first concept map] I only understood that WPL consists of components such as 1) Various of WPL definitions, 2) Theories of WPL 3) Learning Environments 4) WPL tools 5) Evaluation of WPL. I could not see the connecting dots of these components. However, the turning point was when I was shown how some of these components were linked to the theories of WPL. That was when I started to think and reiterate the connections and application of these components (concept map 2). (Ulysses)

The third phase of the IAM is 'negotiation of meaning/co-construction of knowledge'. To do this, students need to see connections and relations between theories, concepts and also evidence (phase 4 of the IAM). The danger of loading students up with a range of theories is that they may not see the connections and relations between them and thus find them difficult to apply. To address this the dialogical teaching and learning process ensures active engagement with the theories in relation to authentic problems. This is observed by Bernard in his comparison of his first and second concept map: "My earlier version clearly illustrated that while I have fragments of understanding here and there, the flow from one concept to another was highly confusing."

Odell's concept map (Figure 3.6. Odell's concept map) indicates relationships between aspects of workplace learning as shown in his interconnecting arrows. The map captures how the nature of the work and organisational cultures mediates affordances for learning. His inclusion of for example, socio-cultural perspectives indicates his epistemological approach to workplace learning.

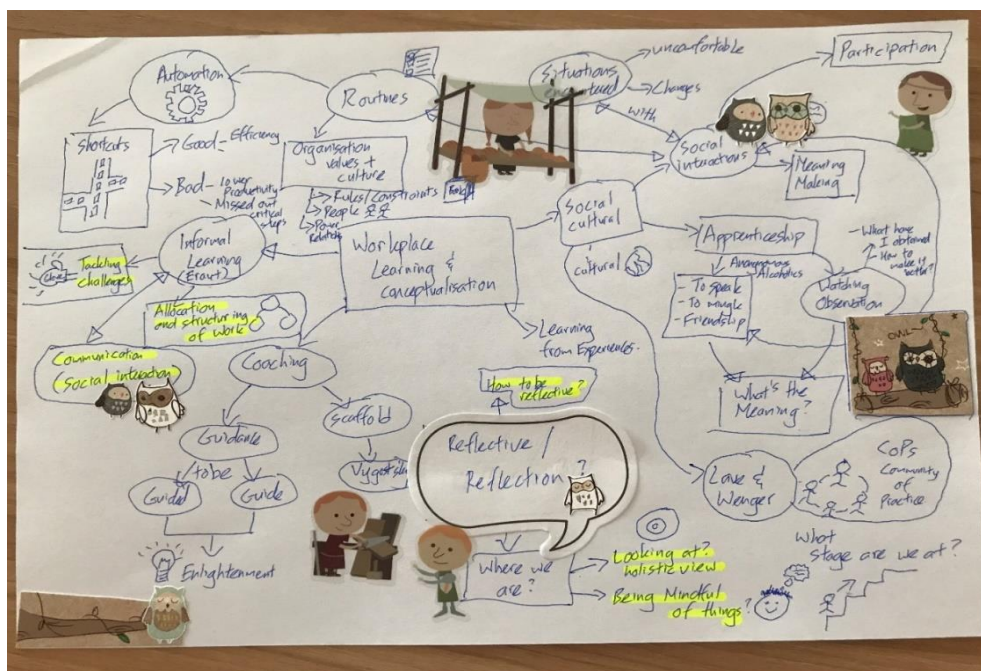


Figure 3.6: Odell's concept map

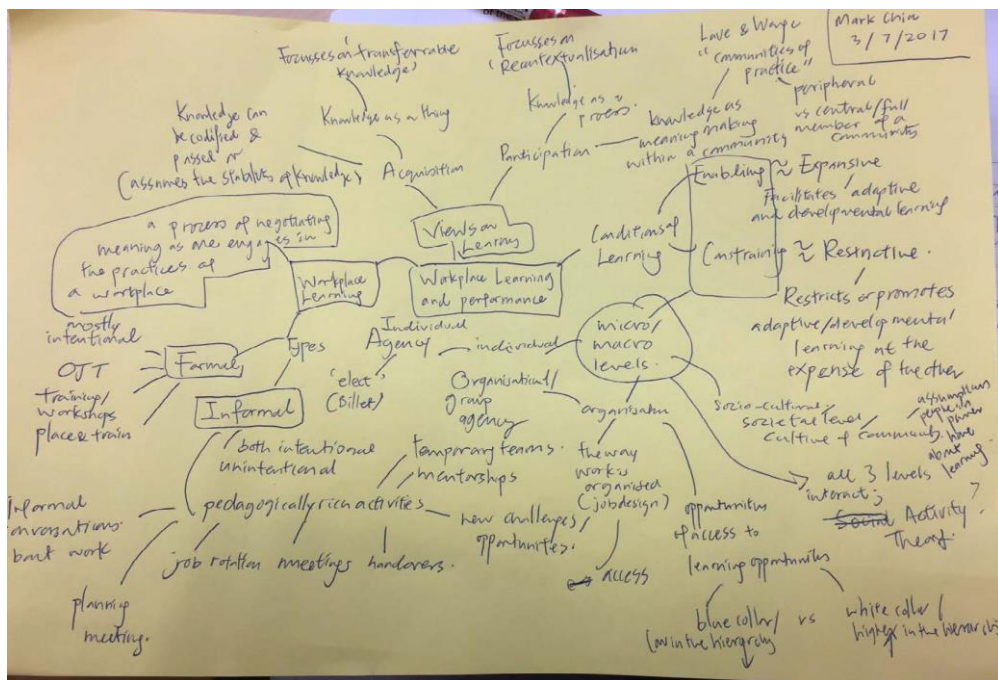


Figure 3.7: Neil's concept map

Neil's dense concept map indicates a more sophisticated understanding of key concepts in workplace learning, such as agency and identity, meaning-making processes and theoretical constructs in understanding enablers and constraints in workplace learning including Fuller and Unwin's (2004) restrictive and expansive continuum.

The data points to a strong relationship between the design of the authentic assessment, the use of inquiry (including reflection) and knowledge co-construction. A major shift for learners towards becoming and being (co)constructors of knowledge was the realisation that there are multiple perspectives and it is the argument used to support their perspective in relation to evidence that is important. The five phases of the IAM¹ (See chapter 2) were evident in student discussion, with a lot of time spent in the first and second phases of sharing information early in the course. However, when we coded group transcripts using the IAM, we found, particularly later in the course, that students would move quickly into phase three, back to phase two, and oscillate between these phases, with occasional insights where they were operating in phases four and back into phases two and three and then perhaps into phase five. The extract from a group discussion in week 3, we coded as phase 5, showed a shift in perspective and deepening understanding of a) the value of consulting those who do the work and recognising that they do have valuable ideas, and b) seeing how different aspects relate to each other. The statements before this extract, were phase 3 statements and those after phase 2.

I think it's different depending on their job scope and maybe the position? And the interactions that they have with different people. And it's quite interesting because for me

¹ Phases of the IAM: 1) Sharing/Comparing of Information; 2) Discovery of dissonance/gaps in understanding/inconsistency among ideas, concepts, or statements; 3) Negotiation of meaning/co-construction of knowledge; 4) Testing and modification of proposed synthesis or co-construction; and 5) Agreement statements/applications of newly constructed knowledge.

when I look at, when I thought that I had identified a certain workplace issue, right? But when I talk to different stakeholders, actually there are more things underlying it and it's interesting ah because then you can also look at it as it is actually related.

In phases two and three, learners grapple with multiple voices, sources of authority on a topic, and interpretations as part of their process of deepening understanding of the ideas they are exposed to and in developing their own knowledge. Flora notes this process of debate and critique in her interview, with some surprise commenting that “no one has a perfect answer”.

Knowledge (co) construction, dialogue, inquiry (including reflection), and authentic problems go hand in hand in developing deep understanding and in learners developing an identity as knowledge builders, as people who can theorise and analyse.

3.6. Conclusion: Relationship between learning activities, inquiry and knowledge building

Making the connections between facilitation, and inquiry and knowledge co-construction, addresses our third research question on the implications of the dialogical approach for the practices of adult educators. The Chapter, 'Rising Above' extends this discussion.

As highlighted in the sections above and in the literature review, use of dialogical inquiry processes and knowledge co-construction involves far more than including group processes that allow opportunities for learners to work together on a task. For example, learners use multiple sources of data (e.g. their own and their peer's experiences, the data they collected, the literature they read), learners share responsibility for reaching a form of consensus, the educator kinaesthetically (e.g. requiring learners to physically place and move themselves in the quadrants of integral theory) introduced students to meta-frames of analysis, the educator consistently turned learner's questions back to the group, she probed for deeper thinking, naming of assumptions held, and so on.

Oscar, in his interview, makes this observation:

That the other Master's classes gives me a sense of more of we're trying to clarify.... Whereas here, although there are a lot of doubts that we will want to clarify with [lecturer of WPL & Performance], but she will actually ask someone else, or the rest of the class, what do you all think. Then from there, she will try to see how we can answer that particular student's queries. So we're forced to you know, communicate, so everybody begins to, yeah, yeah begin to contribute. (Oscar)

Oscar compares the student-educator exchange with the processes in a dialogical inquiry classroom. Throwing back student questions to the group, positions the students as sources of knowledge. It is an old technique, but it is the intent behind the technique that is different from more traditional uses. A genuine belief in the ability of students to work through the question themselves is important. It is not for example, about testing students to see if they have learnt a particular concept or way of understanding a concept. Additionally, this technique and the intent behind it created space and expectations for communication amongst the students, helping to establish shared dialogue as a norm in this learning setting. Implicit in establishing such norms is the critical element of trust. In her interview, Olivia highlighted the difference in the educator's trust in her students.

What surprises me...she trusted all...she, she [the course lecturer] trusted us a lot. Like just give us the reading, and then...because previous lecturer when they do the week 1 reading, they will test. Yeah, but she didn't [laugh]. So I was like, eh, how come she didn't, she trust us so much. (Olivia)

In many ways the issue of belief in and trusting learners is a core tenet of dialogical teaching and learning; there is an expectation of active participation arising through the process of addressing authentic problems, the inquiry process and the co-construction of knowledge. Students in the WPL and Performance course were told at the very beginning that they get out of the course what they put in, that as adults, decisions they made about levels of commitment and participation were theirs to make. This contrasted with students' previous experience as shared by Olivia; students were tested, *to check* on whether or not they had completed the reading. Such actions take away responsibility for learning from the learner and place it with the educator who uses external motivation to gain commitment. Such testing also inadvertently gives the message that what is required is a form of reproduction of the readings, rather than engaging in an active meaning-making process.

The perception of trust is underpinned by the educator's belief that it is important the students make their own meaning, build their own understanding and deep knowledge. This belief also enables the educator to hand over power and control to students in facilitating their own discussions. Bessie notes this responsibility for facilitation of discussions where instead of discussion being "facilitated by the professor" (Bessie), students facilitate their discussions.

Bessie also commented on the amount of movement in the WPL and Performance course. Movement sets up different spaces, physically and conceptually for different kinds of dialogue. Examples from the WPL&P course include:

- the ecology room ran in the first week of the course that required students to move around the room interacting with a range of different artefacts at some 12 different work stations;
- standing on a line representing a continuum between the acquisition and participation metaphors of learning to discuss their own perspectives;
- using integral theory where students chose to stand in a particular quadrant that represented a perspective from which to provide feedback to a peer about his learning intervention design;
- getting up from tables to change discussion groups to move to form groups with those who had similar workplace learning issues.

Xander comments in his reflection, on his experience of the integral theory activity.

The feedback from my classmates during the last activity [integral theory] for this module helped me to gain insight into the different perspectives of the different stakeholders across the individual, team, and nation spaces. The perspectives were diverse and sometimes, conflicting, which prompted me to extrapolate the concerns that could arise out of the different stakeholders should this learning solution be implemented (Xander)

In this activity, students were required to physically move into the space of the perspective from which they made an observation, comment, asked a question. Such movement pays attention to the embodiment of the socio-cultural processes of knowledge co-construction to deepen understanding.

Some key pedagogical techniques and beliefs for implementing dialogical teaching and learning discussed in this section include:

- believing your learners can and will not only make sense of the material, but are active constructors of knowledge.

- trusting that your learners will take responsibility for their learning. Authentic problems and assessment design are important in facilitating learners taking such responsibility.
- not being the only authoritative voice – providing space for learners to be authoritative voices by for example, throwing questions back to the learners.
- providing space and opportunities to experience different perspectives related to authentic problems establishing norms where learners take and have responsibility for knowledge (co)construction and thus for learning.

4. Computer Supported Collaborative learning and Knowledge Building (MLT802)

This course is offered to professionals involved in some form of educative role (e.g. lecturers, teachers, nurse educators, trainers) who are pursuing a Master’s degree or a doctoral degree. It is offered in the first semester (Aug-Nov) of the academic year, with 39 contact hours.

Students learn about computer-supported collaborative learning and knowledge building by experiencing first-hand what knowledge building entails in a learning environment. They are required to identify authentic problems or conceptual issues related to learning, inquire into these problems or issues to deepen their understanding of them using resources such as academic publications and personal experience in their workplace. They need to put forth their ideas in an online forum and collaboratively improve their ideas; they have joint responsibilities to develop the knowledge artefacts (notes on the online forum) that reflect the trajectory of their knowledge co-construction. Throughout the course, learners also need to engage in regular personal reflection by working on pre- and post-course learning biography, and on concept maps and the Map of inquiry. The course assessment includes contribution to construction of communal knowledge, leading class discussion, and submitting an individual portfolio comprising an overall reflection, construction of five concept maps, reflection on inquiry, and collection of key contributions to the class throughout the course.

From the educator’s perspective, the course, Computer-Supported Collaborative Learning and Knowledge Building (CSCL & KB) was designed with the dialogic teaching approach in mind. It was designed to appeal to adult learners by giving them agency and control over the learning processes and topics for inquiry, and more critically, engage them in collaborative meaning making and tapping into their rich experiences as resources for learning. It is well aligned to the effective learning approaches that learning scientists have suggested, such as learning as participation in professional activities and discourse (Sfard, 1998), and learning through creating knowledge artefacts (Paavola & Hakkarainen, 2005). Specifically, this course focuses on knowledge building (Scardamalia & Bereiter, 2015) through engaging learners in discursive activities intended to enhance collective understanding (Bereiter, 2002) supported collaborative learning technology.

To allow the learners to learn knowledge building by participating as a knowledge builder, this course incorporated the key principles of knowledge building (Scardamalia & Bereiter, 2010), as shown in Table 4.1.

Table 4.1. Applications of principles of Knowledge Building in the course CSCL & KB

Principles	Examples of Initial Approaches to Guide the Students
Idea-centric approach	
<i>Real ideas, authentic problem</i> Engage students in inquiry related to problems that arise from their effort in understanding the world.	Trigger students’ curiosity and interest in a topic and help them to generate inquiry questions. For example, “Dillenbourg (1999) distinguished between cooperative learning and collaborative

Principles	Examples of Initial Approaches to Guide the Students
	learning. Why? Are these two concepts different? Are there similarities?"
<p><i>Improvable ideas</i> Treat all ideas as improvable.</p>	From the students' discourse, show the students a few examples of good ideas and to think of ways to improve the ideas further. Explicitly talk about respecting one another's ideas.
<p><i>Idea diversity</i> It is good to identify ideas that are related and to have a variety of ideas that approach the same problem from different perspectives.</p>	Highlight examples of ideas that are different because of different perspectives or different ways of approaching the same inquiry problem. Identify the values of how these differences enrich the way we think about an issue or approach a problem.
<p><i>Rise above</i> The aim is for students to be able to integrate ideas, to synthesize new ideas, or to use higher level principles or theory in explanation.</p>	Demonstrate to students how different ideas can be integrated to become a better idea; how to go beyond listing discrete facts and pieces of information to understanding a topic or a problem from a higher level principle or theory. For example, relating the seemingly different concepts of "constraints" and "affordances" as both ways to facilitate learning.
Knowledge building practices	
<p><i>Authoritative sources of knowledge</i> Students should make meaning of authoritative sources of knowledge, not just acquiring the knowledge, but also to use them for the inquiry.</p>	Provide students with selected articles for meaning making. Highlight how to assess the information critically for accuracy, how to interpret the meaning of the information, and how to use relevant information towards the goal of the inquiry.
<p><i>Knowledge-building discourse</i> Students should engage in productive talks that focus on active listening and building on one another's ideas, rather than competing to win an argument.</p>	Show examples of good and productive talks and get students to apply them mindfully. Teach students how to negotiate differences. Contrast productive talks with talks that are competitive, disputation in nature, or those that are of simple agreement or disagreement without providing reasons.
<p><i>Transformative embedded assessment</i> Assessment is not a separate activity. We can integrate assessment <i>for</i> learning and assessment as learning seamlessly in the process of knowledge building; encourage self-assessment.</p>	Use students' notes as evidence of learning. Use analytics (e.g., analytics in the Knowledge Forum®) to provide quick feedback to the students. Engage students in discussing the criteria for assessment and the criteria to assess the quality of notes in the discussion. Get students to assess their own notes. In this way, assessment is part of the learning process.

Principles	Examples of Initial Approaches to Guide the Students
<p><i>Symmetric knowledge advancement</i> Recognize different expertise among students; having them take turns to lead and contribute will eventually benefit everyone.</p>	<p>Help students to identify different expertise and strengths among them and encourage them to take turn to help one another. Increase students' awareness that we benefit and learn in the process of teaching others. Teach the students about collaborative strategies.</p>
Develop knowledge-building capacity	
<p><i>Pervasive knowledge building</i> Develop knowledge-building practice as a habit of mind to be applied across various learning contexts and subjects, not just an ad hoc application.</p>	<p>Use knowledge-building approach consistently, regularly and frequently throughout the course.</p>
<p><i>Democratizing knowledge</i> All students have the rights to contribute in knowledge building, not just the privileged.</p>	<p>Emphasise that every student has the rights (and responsibility) to participate and contribute. Set class rules about respecting every participant. Provide opportunities (online and face-to-face) for students who are less confident to contribute in class.</p>
<p><i>Collective cognitive responsibility</i> Develop in students the attitude that everyone has the responsibility in advancing the collective knowledge to the benefit of the community.</p>	<p>Allocate some points for positive group behaviours. Provide opportunities for students to create something as a whole group or class (e.g., group portfolio and group taking turns to lead discussion).</p>
<p><i>Epistemic agency</i> Help students develop the ownership of learning and autonomy in doing knowledge building.</p>	<p>Let the students know that their ideas matter; find opportunities to highlight good ideas contributed by the students. Provide opportunities to show autonomy in their learning. Encourage students to show autonomy by sharing relevant resources or initiating new inquiry.</p>

As with the previous Chapter, this chapter uses the research questions to structure the presentation of the findings. The first section, 'Learners' perception of the values of dialogical teaching and learning' is followed by, 'Moving from didactic to dialogical approaches'. In this section we explore the challenges students experienced as they grappled with different responsibilities for their learning. 'Learners' awareness of their own inquiry processes' follows and the final section, 'Knowledge co-construction' is followed by the conclusion which touches on the implications for teaching and learning.

4.1. Learners' perception of the values of dialogical teaching and learning

... as compared to the more... traditional way, because you're hearing one voice, but now you're actually hearing a lot more voice(s)... you can hear different voices and where they are coming from. You may not always agree, or perhaps sometimes we may not even understand,

but you at least should be aware... You hear more... things, rather than just from single point of view... Yes, sometimes, when particular group actually tried to start out the discussion, on affordances, they could actually branch out onto certain concepts on affordances, or give certain examples to integrate the concept, the principles of affordances, and these are things that I would not think of. (Dylan)

This quote from student Dylan illustrates the manifestation of core values of dialogic teaching and learning in this course. Nolan shared the same sentiment that this mode of instruction “draws the discussions from the students...even the quietest student would have a say...” Dialogical teaching, “a pedagogical approach that involves students in the collaborative construction of meaning and is characterized by shared control over the key aspects of classroom discourse” (Rezintskaya & Gregory, 2013, p. 114), underpins the design of this course. There were strategies that aimed at having learners’ voices and shared control of the classroom discourse. For example, groups were asked to take turn to facilitate online discussion and to bring the discussion to face-to-face class meetings. The knowledge building principles (Scardamalia & Bereiter, 2015) were used to design the dialogic approach to learning for this course.

Critically, it is not just the opportunities to hear more voices, but the affordances to bring multiple perspectives to the topics being discussed. This experience of awareness of diverse perspectives is important in this class, because diversity of ideas “gives you an opportunity to explore those avenues, because you, maybe you didn’t even think along those lines” (Sandra), and this exposure to different ideas give rise to “cognitive dissonance,” prompting one to engage in “critical thinking” as compared to a monologic approach dominated by the educator’s delivery of content (Diane). John opined, “it’s more than just about downloading of the content knowledge, it’s a lot more about how you can piece other people’s perspectives and then contextualize it with your own.” Urijah felt that sometimes after reading a paper individually several times, one can still “miss out certain things,” but enlightenment could sometimes be attained from peer’s explanations or interpretations.

What learners expressed about their learning experience are in alignment with the knowledge building principles (Scardamalia & Bereiter, 2015) of idea-centric knowledge building. In knowledge building, the ideas that learners really care about are captured as epistemic or knowledge artefacts in a forum, a shared space that has an “out in the world” (Popper’s World 3) existence (Scardamalia, Bereiter, & Lamon, 1994) so others can build on these ideas. When done well, learners are willing to share their perspective, leading to a natural collection of diverse ideas. These ideas become important resources for building better ideas when learners are able to integrate different ideas, with the ultimate goal of attaining higher level of explaining the topic being discussed, such as higher level of coherence, stronger backing with evidence, or using theory or principles.

Beyond the cognitive benefit of creating better ideas to represent deeper level of understanding of a topic, the experience of having multiple voices and perspectives are beneficial to the learners in other ways. Some learners (Dylan, Quentin) reflected that they are more engaged in the learning process. Dylan explained the reason for higher engagement:

Compared to traditional teaching where, normally, you just listen ... the traditional teaching is also pretty well-supported with lecture notes and slides, so sometimes you get momentarily switched off, you know you can still fall back to the slides and try to catch what has been taught... But I think for the dialogic teaching, you are more engaged, more involved, because it is dialogic, as the name suggest. I think this is one of the key differences that... one of the key difference that I felt.

To Dylan, the “traditional” mode of instruction where notes and presentation materials are regarded as the reference materials that learners could fall back on, even if the attention was drifting in class.

The higher level of engagement could also be due to the self-motivation developed in their learning journey.

Because mainly a lot is student-driven... we only go to Dr Tan's class once a week, after that, a lot of it the rest of the 7 days we need to do our own research, our own discussion with our group members. So a lot of it is self-motivation, self-driven (Kathy)

Quentin elaborated what it meant to be self-directed and to some extent, personalised learning:

I guess this approach makes a little bit more personal for me because you can therefore own the learning process to some extent. 'Cause things are not bounded, therefore have the ability to also I guess suggest and also propose certain topics. And therefore as a group you can therefore also move how fast you want to pursue something, how deep you want to pursue something.

This self-directed learning was also promoted through the self-directed assessment, as shared by Kathy:

We get to check our own progress. Because in knowledge forum there's a function whereby we can assess and check ourselves, our own progress. Can also see... the various classmates who logged in, the exact timing. We can even see our own lecturers when he logged in, when or whether or not he read our posts and so on. So a lot of it is self-driven, self-assessment. Yeah so maybe what surprised me was the ability to assess and check myself. And also check fellow classmates whether they are doing the work.

Diane reflected that learning in such an environment, the accountability lied in the students' hands because they have to assume "shared responsibility" and learners know that they are "accountable to the other members in the community." Developing collective cognitive responsibility was one of the principles of knowledge building, and it seems to be have been developed among some learners. Diane recalled:

I think, as a... this is my first experience with CSCL, right, and... knowledge forum... initially, I think there were some struggles in not knowing the... you know the whole, the whole knowledge sharing is going to lead to... But I think at the end of the course, there was a chance to do the reflection, yah, I find out that there was a... more, yah, the accountability on the learners' side as well as the empowerment to go and... yah, I feel what you want to achieve is basically in the, in the learners' hands.

Nolan opined that shared responsibility is critical, just like in the workplace, "you need to speak up if things are not right, or things should be in a certain direction."

In terms of the perception about the new online learning space, Diane reflected that learning through computer-supported collaborative platform such as Knowledge Forum was a novel experience "community building knowledge together on knowledge forum... definitely very different from what I had previously envisioned what collaborative teams, you know, how teams would work in a collaborative environment." Sandra and Urijah both felt that they benefited from the sharing in the online forum as the content of peer's notes helped them to clarify some concepts and gain deeper understanding.

Kathy also liked the analytics related to the forum that affords self-assessment:

Because in knowledge forum there's a function whereby we can assess and check ourselves, our own progress. Can also see who are the rest, the various classmates... who logged in,

the exact timing. We can even see our own lecturers when he logged in, when or whether or not he read our posts and so on. So a lot of it is self-driven, self-assessment.

John also appreciated the analytics associated with Knowledge Forum, but suggested to introduce these analytics earlier in the course so that the students can use them earlier.

The central goal of dialogic teaching, empowering learners' voices and developing shared classroom control, seems to have worked well with some. There were learners who were ready for such challenge and felt that such a learning environment was beneficial to them. The challenge of moving from didactic approach of instruction to dialogic learning, is explicated in the next section.

4.2. Moving from didactic teaching (direct instruction) to dialogical teaching and learning

The feedback from Diane during the interview captured some of "surprises" that students experienced in this course, particularly about how the course was organised and how the students were assessed:

I think the whole, the way the course was structured, came as a surprise. Yah, because it's very different from how the other courses have been structured, so, like, the weekly contribution, adding up to, you know the, the... building up towards the folder that we are doing, and then the, how, you know, the weekly contribution actually adds up to the, to the entire course, and eventually affecting the grade that you get, was also quite, was also a surprise to me as well... I never thought of a course being, you know, that I'll be assessed based on what... what is being created as a community, when the thing that we're trying to create, is not even known... it's very much different from the other course, courses that are more, that, when they, you know it's more predictable, and you know that, oh, like the typical courses that I've attended, it's you know you, there are readings, and then after that there's presentations, and then you share your reflections on reading, so those are more... those are things that we're very much familiar with, whereas the structure in this course, as well as the assessment components, they are, they are entirely, they are very different.

To elaborate on the dialogic design of this course, in the first session (a face-to-face session), a 10-page course outline was provided to the students during the first session, outlining the learning objectives, the approach, the schedule of topics, the criteria and rubrics for assessment, and a list of references. The learners were assigned to four groups and stayed with the same group throughout the course. The group assignment took place in the Knowledge Forum and was based on heterogeneous criteria, trying to mix learners from doctoral and Master's level, and different work experience. The educator led the discussion of the first two sessions. Starting from the third session, the group took turns to facilitate the online discussion. Each face-to-face lesson follows the same structure: (a) student-led discussion; (b) clarification by the educator; (c) educator-led discussion and elaboration; (d) short break; and (e) class activities, often aiming at "rise above". For the online discussion, the educator assigned one paper and encouraged the group to identify other relevant papers for discussion. Learners could choose one of the papers from the reference lists given in the course outline. The educator-led discussion often starts with a summary of the student-led online discussion in the Knowledge Forum, a highlight of some of the notes that caught his attention, and a map of keywords of the discussion (extracted using a text-mining software SOBEK). This transition from the predominant approach of direct instruction to a dialogic approach put many learners out of their comfort zone. Dylan shared, "because... my education, you know, is predominated by, you know, very, more traditional (instructive) teaching style." Even though there are design principles underpinning the lessons, the students found it "lack of structure", especially during the first few sessions, as epitomized by the comments from Kathy:

At the beginning I wasn't very sure when the course first started. And it was very different because usually the course that we attend we are, we have all the material online or Blackboard, you need to download the readings every week, you know what's going on. So at the beginning we were, I was quite surprised because there isn't a structure.

It is noteworthy that despite a course schedule being given with the topic of discussion for each week, by not providing and prescribing all the materials for reading, the students were rather uncomfortable. Fortunately, Kathy was able to adapt to the more learner-driven approach,

And then after that I think by week three, we kind of like get the hang of it. We know how the course will proceed and we understand that you as the student will need to do most of the work.

The discomfort was partly due to the multiple voices from the students, which was a little disconcerting for some, perhaps because they were waiting for an authoritative voice to provide a definitive answer to some of the questions they were pursuing. Referring to the discussion on comparing cooperative learning with collaborative learning, Quentin said:

For example... there was quite a lot of focus on collaborative versus cooperative learning... after a few sessions it was clearer but when we were doing it at that point in time, I guess the answers because they came from the class and it was expressed in different levels of explanation and accuracy and therefore... sometimes you might therefore introduce additional content you would not be expecting and sometimes the content may not be the most precise or the most concise or the best to be hearing about.

Likewise, Urijah felt loss because of the various strands of talk in the forum, sometimes the discourse was about topics that was not in the "right direction" or not related to the original trigger question. Urijah was rather uncomfortable with the amount of irrelevant information being posted: "Everybody seems okay, contributing to more and more information but I'm always asking the bigger thing that what is this all about."

There were learners who felt that the discussions should be anchored by the educator to provide some closure. Nolan opined,

But somehow I thought at some point and at the end of each lesson, ... there must be some form of anchoring by the facilitator or the lecturer... There must be some, some form of closure, no matter what, whether we are satisfied with the answer or not, but there must be some form of closure at the end of each lesson... it's more to reduce the uncertainty... to see whether our thinking process and our line of discussion is uh, is something that is uh... is in line with the lecturer?

The educator was trying not to prescribe the definitive answers too early for a few reasons: (1) to provide learners more opportunities to voice their views, (2) to encourage learners to reach consensus among themselves, and (3) to avoid learners building the expectation to hear from the "authoritative voice" and disregard their peers' views.

Some students were uncomfortable with the dialogic mode of instruction because it was different from the very structured lessons that they were accustomed to, and they did not know how to do well in this course. Quentin shared about how the classmates felt when the educators did not provide all the answers but asked more questions:

Sometimes it's just easier to rely on the professor to just tell you everything. But this one I guess we have to read up beforehand to benefit more. And I got take notes of questions my

professors are asking also, what are they actually prompting us to think about. Because there's not much lecturing per se... it's always questions asked and we solicit answers after discussions either at a group level or as a class level and then educator will quickly do a post mortem type of review and then ask more questions and then everybody answers... So that was, I think that unnerves certain people because we are, I think we are quite reliant on expecting the professor to know everything and all the answers. In this experience I didn't find their answers that forthcoming but at the same time there were enough clues and hints that more or less directed us to what we might know or might not know.

This asynchronous mode of discussion also required new way of interacting with peers. It may cause some degree of ambiguity when real-time instantaneous clarification and non-verbal cues were not available. John, for example, recollected that "when people, other people do not respond that much to your post, then you kind of question whether you, whether you raised a point that is valid and whether you have an idea that allows others to elaborate on."

Learning how to use Knowledge Forum is, however, a necessary process before it can be used productively. With the availability of many mobile applications and social media, John felt that the "interface (of Knowledge Forum) was quite old" and could cause some frustration. Sandra recalled that it took the students several weeks to get used to learning via the online forum. To Thomas, however, it is still preferable to engage in face-to-face discussion.

To some students, the challenge came from the much higher cognitive demands. Sandra shared: "...suddenly you have to take a call, you really need to decide and then make sense, make sense of the article and maybe, you know synthesize and articulate properly." This meaning making process was daunting to some for various reasons. Sandra felt the responsibility to post notes that make sense to others, and that can promote further discussion because "whatever I'm putting on there (online forum), it has to be making sense to them (peers). And subsequently result in more discussions, right?" Sandra felt the pressure that some classmates were able to articulate their ideas eloquently, and some classmates were doctoral students. It didn't help that Sandra did not experience Singapore mainstream education system, and was working in an international school. For this reason, she was not able to contribute as much when the discussions focused on the local education system.

To some learners, the cognitive challenge occurred because of their background knowledge and expertise in other fields rather than education. Thus, having to study this course "is really more like the paradigm (change), rather than concepts being taught," opined Dylan, who came from another college in the university. To Nolan, the course was challenging because the last time he attended a formal course was about 30 years ago.

Another cognitive challenge was the concept mapping task. It was introduced to allow individual to make sense of the key ideas being discussed and to relate various concepts. Some learners, however, were not familiar with this mode of representing information. Urijah, for instance, shared that "I don't think I'm doing it the right way."

A further source of challenge is the group processes, particularly during the initial phase of the course. When the students were not very familiar with one another, they found it hard to interpret the motives behind certain discourse. Diane explained: "because we were all still not familiar with one another, so... (what) some people say... may not go very well initially and... then you would tend to, you know, jump to certain conclusions."

Another tension in the group process was felt when a classmate was dominating a discussion on a topic that was not of interest to the rest. Quentin recalled:

I guess it does irritate the course mates a little bit more when someone dominates as well. It's a conversation that goes on and on, someone pursues a topic that no one cares about. All too polite to shut it down, it does waste time in that sense.

While the intended learning design was to foster collaboration among the learners, there was still a sense of competition. In one of the sessions in the latter part of the course, the educator illustrated the analytic tools in the Knowledge Forum by showing the online participation behaviours such as the contribution rate from the students. John felt the pressure to have people respond to one's posts "(b)ecause eventually...they did identify people who are the highest contributors and normally these contributors, their post are better responded to by other people." Likewise, Sandra was envious of the classmates, "the way they used to articulate their thoughts... I used to wonder how they're doing it."

Fortunately, there were learners like Dylan, who could overcome the initial discomfort with the dialogic mode of instruction, and eventually benefited from the dialogic mode of instruction. Dylan reflected, "I was quite intrigued by the fact that despite the lack of very... more rigid teaching structure, may I put it? Yah, the objectives, the learning objectives, all that, seems to be met." Quentin was another learner who appreciated the learning design and how the educators encouraged collaborative inquiry through questioning:

I think there was a... there was a hidden structure. It was always there, just wasn't that explicit. I didn't think it was that bad, because on one hand it allowed us as a class to pursue certain things I think where, 'cause the class is made up of quite a number of people with all different interests. And it allowed the class to therefore dictate certain interests which is otherwise lost in a rigid curriculum; and two, I think through the conversations we had in class, I think we had a deeper understanding of certain topics as well. While we may not cover breadth but I think in terms of personalizing the lessons to what people might be interested in, I think there's an improvement to that area...on hindsight and reflect on it, I think the questions helped. Because the questions were never meant to just end the class so we were always left with questions at the end of class as well. I think those helped because at least in moments when I sometimes think about what exactly happened in that class, why was that question asked... there were prompts and triggers in that direction so I appreciated that.

Urijah, another learner who appreciated the questioning by the educators, commented, "what's the difference between analogy and metaphor?" Urijah felt that the educator's questions "get us to think deeper and then the answers he provided are succinct so it makes it clearer. So there's not a lot of talking on his part, which is quite good actually because then we are not too overwhelmed and too bored." Intriguingly, Urijah, who was not familiar with concept mapping, shared that this learning activity has values in helping one to see how various pieces of information fit together in the whole picture:

so when I start to read I have to think how does this information fit into the whole picture, and so that instead of just merely copying sentences after sentences - accumulating notes - I have to then think what is the theme that I'm going to put - how do they link to the other information... So all these helps me to formulate the ideas better and clearer in my head, so it gives me an overall better picture of the whole...what the whole article is or paper is about.

Urijah also shared that learners need to put in effort to adapt to the new mode of learning. Urijah recalled the "lousy feeling" during a discussion due to the lack of preparation. "I felt really lousy and I thought I was there for ... two to three hours - and what am I doing here tonight? (laughs) I'm not enjoying and I'm not understanding what is happening...I do not understand what is happening and I'm like lost." This served as a "wake up call" for Urijah to read and prepare for the lessons.

4.3. Awareness of dialogic inquiry process and metacognition

This course design provided learners the affordances to reflect on their learning and be aware of their dialogic inquiry process. For example, the questioning by peers and educators, exposure to alternative perspectives on the same issues, the task of rating their ways of inquiry and concept mapping contributed to their metacognitive awareness.

The Map of Dialogical Inquiry provided opportunities for the learners to reflect on their inquiry approach and ways of thinking. Sandra was able to reflect on the various processes and emphasised that time was needed for a particular experience to evolve. For example, reflecting on experiencing, Sandra recalled the experience of implementing the concept learnt in this class in teaching: “By implementing, doing my own class, ok, it was quite a wonderful learning experience for myself and my students... that was something which started out slow.” Thomas shared the same opinion, recalling the changes and reflecting: “through this exercise of KB (knowledge building) you do a lot of self-reflection, you reflect on a lot of things then you share, because you need to reflect before you put in the KB.”

Kathy shared that there was a progressive improvement in the scores of her Map of Dialogical Inquiry because initially the technical aspects of using Knowledge Forum and their motivation and enthusiasm of inquiry gained traction when the team members began to know one another better and were able to talk the “same wavelength” . Diane opined that the ways of thinking suggested in the inquiry map reflects the logical progression of thinking: “At the beginning I think we tend to look for more concrete ideas, and then the more specific things, then as we move along...I think that being able to generalize certain ideas.”

There are other learners who felt that the scores for inquiry map could vary depending on a number of factors. For example, the nature of the discussion could have an impact on the learners’ inquiry approach, as Dylan shared “the growth of that particular domain stopped when the activities, or the kind of discussions we had was actually shifted onto other forms.” Dylan also shared that the rubrics provided has helped in this reflection process. Figure 4.1 shows the changes in Dylan’s map of inquiry over time, which shows a general increase in the various aspects of inquiry.

Quentin, likewise, shared that the inquiry process started again when a new topic was introduced and there was stronger inquiry during the weeks when the group was leading the discussion and class presentation. Quentin used the term “roller coaster” to describe the variation of inquiry scores over the weeks. To Quentin, the learning also suffered when there were lower scores, reflecting lower level of inquiry:

I think maybe I hazard a guess that the dialogic process, when it works and it deepens, it deepens deeply. When the discussion was quite surface, and not enough people are contributing, it tends to also weaken, so that - those weeks reflected, to my inquiry, reflected those weeks where discussion, I felt wasn't as enriching. So it'll be lower. Therefore, some of my scores were lower as a result.

Compared with the map of inquiry of Dylan (Figure 4.1), Quentin’s map of inquiry (Figure 4.2) shows more variation across weeks though there is still a general increase in scores in all aspects of inquiry.

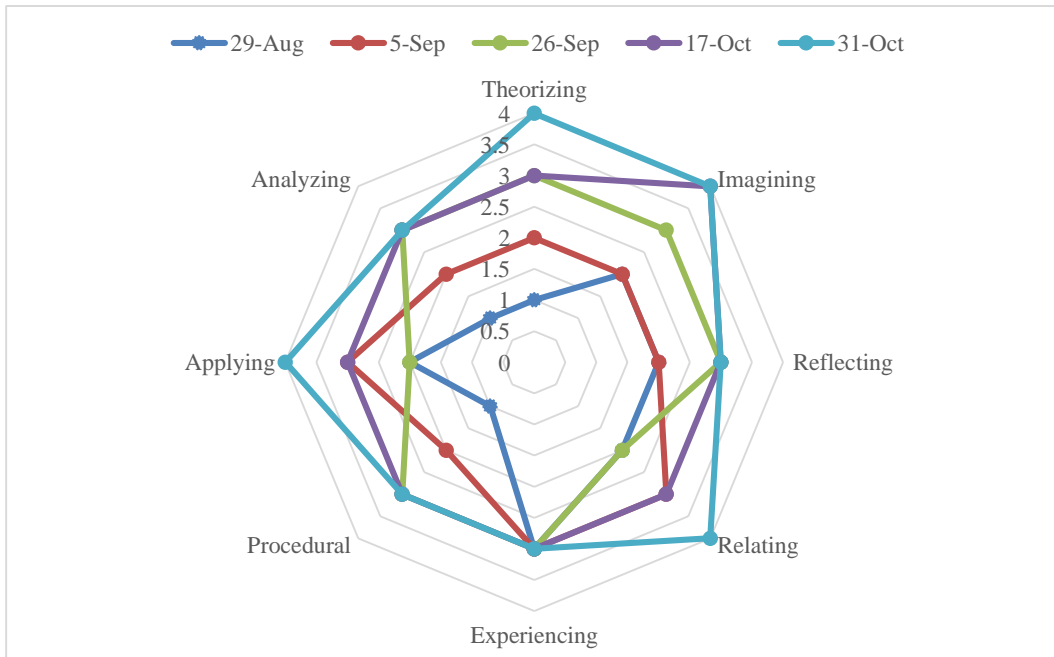


Figure 4.1. Map of inquiry of Dylan over time

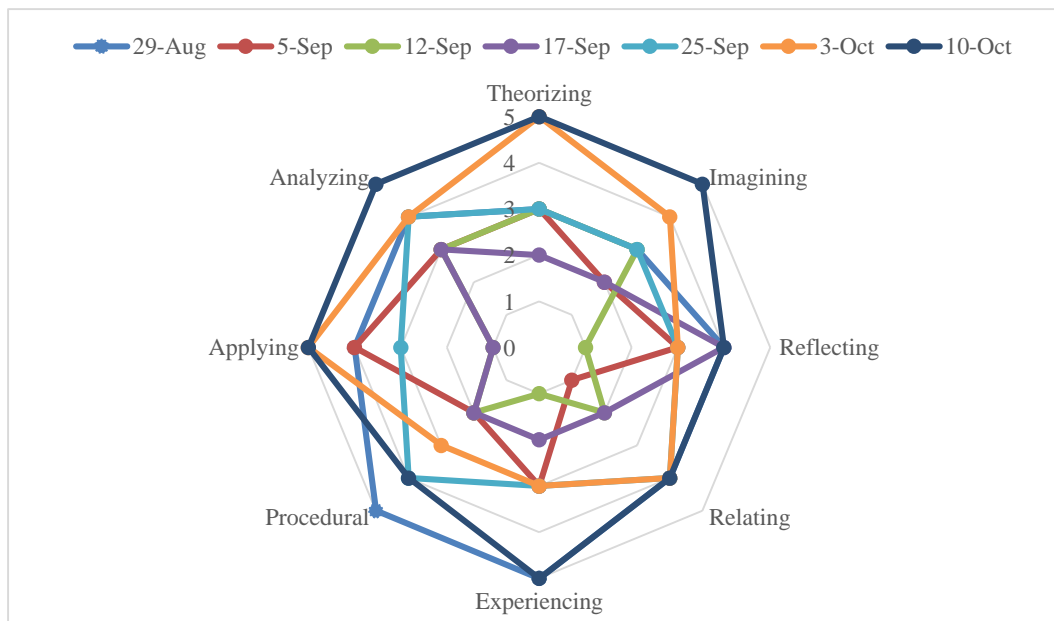


Figure 4.2. Map of inquiry of Quentin over time

There were learners who took the rating of the inquiry map seriously, such as Urijah, who was entering the ratings without much thought initially, but contemplated for the appropriate ratings later: “is this going to be a three or a five? Is it really that I’m benefitting; what did I really learn?” Urijah recollected, “At first I didn’t know what the inquiry was about but I thought it is a good reflection of how I’ve taken the learning, and it’s also a good way for me to summarise certain themes.” On the other hand, there were students (e.g., Nolan) who were not keen to use the inquiry maps because there was no attempt by the educator to gain buy-in from the students. By that Nolan means that the educator should have explained the rationale and benefits of doing the inquiry map.

All participants from this group submitted every inquiry map during the course. The mean scores of the first and last inquiry maps were analysed with the dependent t-tests. This analysis was conducted to determine whether the observed increases in scores between the first and final inquiry maps were statistically significant (i.e. instead of by chance). A summary of this analysis can be found in Table 4.2, and a more detailed summary of the t-tests can be found in Appendix 2.

Next, a repeated measures analysis of variance (RM-ANOVA) was conducted for the inquiry domains that were found to have significant increases in the dependent t-tests as show in in Table 4.2. This series of RM-ANOVA was conducted to determine whether the observed increases in scores from the first inquiry map and in the later inquiry maps were statistically significant (i.e. instead of by chance). The summary of the results of these RM-ANOVA tests of every inquiry domain can be found in Appendices 3 to 5.

Table 4.2. Summary of Dependent t-test of First and Last Inquiry Map Scores, indicating significance

Inquiry Domain	Descriptor	Increases in Scores	t	df	Sig. (2-tailed)
Theorizing	Participants were observing more theorizing in their inquiry process during the later part of the course; this would include them wanting to know reasons behind things, using or developing models to explain why, seeking to understand or determine underlying principles, and seeking coherency.	1.00 ± 1.11 points	-3.37	13	0.005*
Imagining	Participants were engaging in more imaginative activities in their inquiry process during the later part of the course; this would include them speculating and playing around with about ideas, taking risks and breaking rules, being creative and involved in designing, looking for alternatives, exploring new possibilities, and imagining other perspectives or scenarios.	Not significant	-2.01	13	0.066
Reflecting	Participants were reflecting more in their inquiry process throughout the course; this would include them reflecting on their learning process, engaging in big picture and systems thinking, including other ways of thinking, seeking to reveal and relate to values, considering paradigms and cultures, and using metacognitive processes	0.79 ± 1.12 points	-2.62	13	0.021*
Relating	Participants were relating more in their inquiry process during the later part of the course; this would include them using intuition and empathy, seeking personal meaning, sharing their own experiences, building relationships and meaning with their peers, and also expressing their feelings, opinions, and values.	Not significant	-1.10	13	0.290

Experiencing	Participants were experiencing more in their inquiry process during the later part of the course; this includes them observing and perceiving, doing and making, engaging in kinaesthetic experiences, and seeking authentic experiences	Not significant	-1.96	13	0.071
Procedural	Participants were engaging in more procedural activities in their inquiry process during the later part of the course; this would include them focusing on details, following procedures, working with clear rules, ordering and categorising, defining terminology, and focusing on accuracy and precision.	Not significant	-1.00	13	0.336
Applying	Participants were relating more in their inquiry process throughout course; this would include them putting into practice what they are learning, asking "Wha would I do?" questions, planning and thinking strategically, acting ethically, projecting implications or outcomes, and learning what is relevant for now and with the need for context.	1.07 ± 0.92 points	-4.37	13	0.001*
Analysing	Participants were relating more in their inquiry process throughout course; this would include them engaging in logic (e.g. thinking, peer-discussion), using analytical techniques (e.g. in solving problems), seeking patterns, similarities and differences, thinking about the advantages and disadvantages of solutions, offering critique, and also deconstructing and interpreting ideas.	0.71 ± 0.91 points	-2.92	13	0.012*

* indicates a significant increase for this Inquiry Aspect

Based on this statistical analysis, four of the eight aspects of the map showed significant increases (see Figure 4.3 graphically illustrating changes over time). As learners increased their understanding of and ability to engage in different aspects of the map, built knowledge through readings, constructive dialogue in class and on the class online forum, and engaged meaningfully in dialogue, so the scores increased.

As this course required the participants to refer to many academic papers in their discussion, the increase in theorizing is not surprising; theory is also one of the main scaffolds used in the Knowledge Forum. The course requirements for the participants to score their map of inquiry and to create concept maps throughout the course might have contributed to the increasing reflection score. As productive knowledge building discourse was emphasized, which entails applying epistemic criteria to assess others' ideas and to improve the ideas. This might have contributed to the increase in the *Analysing* scores. The participants were also required to apply what they have learnt to classroom practice, which could have contributed to the *Applying* aspect of thinking.

On the other hand, the other four aspects of thinking did not show significant improvement. It could be the case of fluctuation (moving up and down) through the course, or it could also mean the design of activities did not engage the participants as much, or that the participants did not perceive the

engagement of these aspects of thinking. This is an area that can be explored further in subsequent studies.

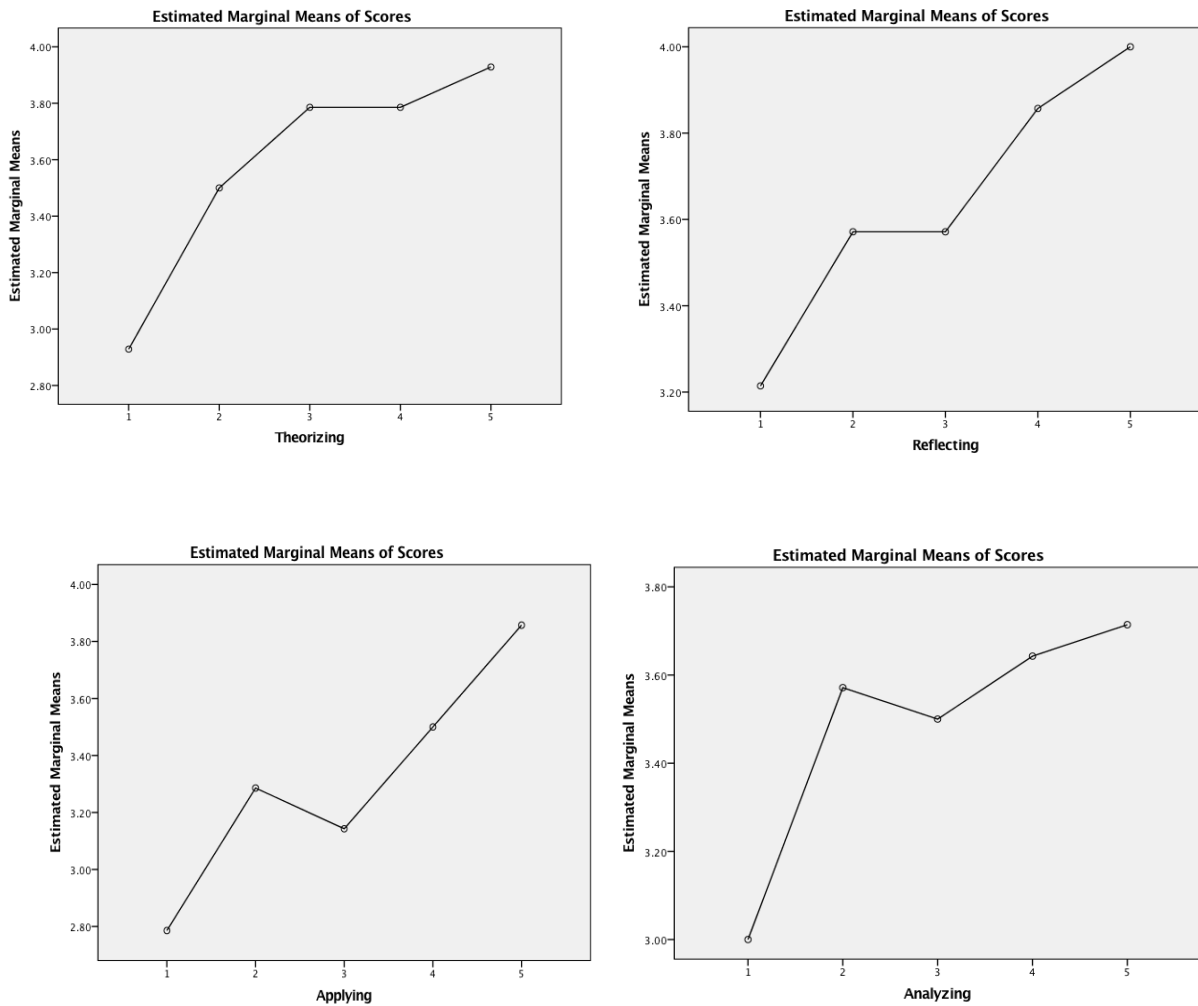


Figure 4.3. Changes over time in significant aspects of dialogical inquiry

Further analysis of the four inquiry domains that indicated a significant increase was done using a RM-ANOVA. Of the four domains, only *Analyzing* was found to be not significant. Scores in the *Theorizing* inquiry domain of the first inquiry map significantly increased when compared to the later maps (i.e. Maps 3, 4 and 5). In the *Reflecting* inquiry domain, the scores of the first inquiry map significantly increased when compared to the last maps (i.e. Map 5). In the *Applying* inquiry domain, the scores of the first inquiry map significantly increased when compared to the later maps (i.e. Maps 2, 4 and 5). This provided confidence that the increases observed in these inquiry domains were statistically significant.

4.4. (Co)construction of knowledge

In the previous sections, learners reported that they developed shared cognitive responsibility and that their voices were valued; these are favourable conditions for learners' co-construction of knowledge.

Dylan shared how his view about knowledge creation has changed. Coming from another school in the university, he was familiar with Nonaka and Takeuchi's theory of organizational knowledge creation, but after attending this course, he was exposed to other theories of knowledge creation. A few learners (Thomas, Urijah) talked about changing conceptions of cooperative learning versus collaborative learning, as well as the meaning of constraints and affordances (Dylan, Urijah, Nolan). Nolan reflected that he realized the knowledge building approach can be applied with lower track learners, contrary to his preconception that it was only appropriate for "smart" students. This suggests that learners could achieve some of the learning objectives set up by the educators, particularly in understanding nuances of meaning behind some learning concepts.

Overall, learners' perspectives about learning has changed. As part of the learning biography, the they were asked "What does learning mean to you?". It was an open-ended question with no word limit. Learners worked on the learning biography during the first and the last lesson over 13 weeks. From their writing, four main views surfaced: learning as acquiring knowledge, learning as active processing of knowledge, learning as a social participatory process, and learning through knowledge building. For example, learner A wrote "Learning means acquiring knowledge and skills and a change in attitude" for the first attempt and "There are three metaphors of learning: acquisition, participation and knowledge-creation metaphors (Paavola, Lipponen, & Hakkarainen, 2002)."

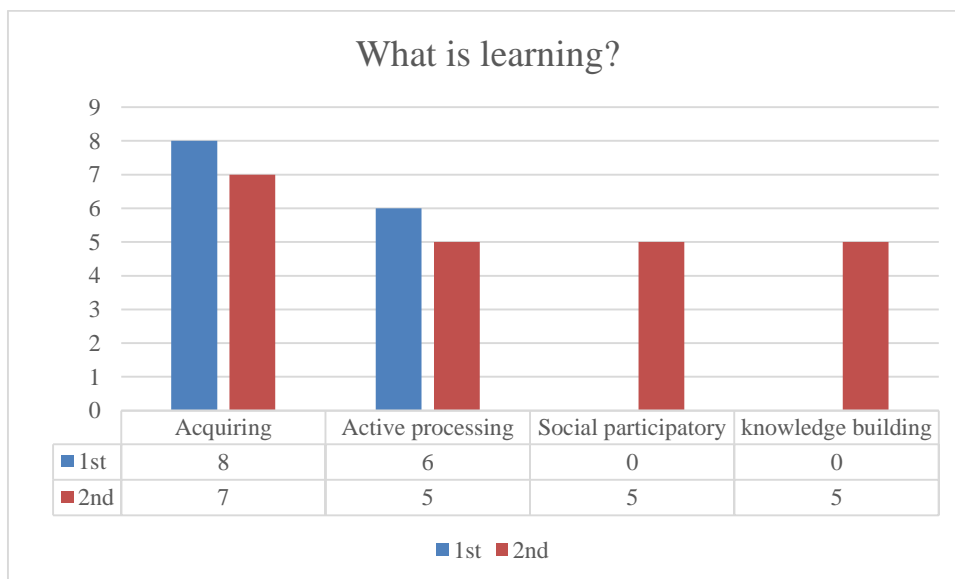


Figure 4.4. Changes in conception of learning

A comparison (1st lesson and last lesson) of the frequency count of these four views of learning is shown in Figure 4.3. Note that there could be more than one view presented in the same statement, so the total frequency is higher than the number of students. Learners' view about learning changed greatly. In the first round of survey, students predominantly viewed learning as acquiring knowledge, followed by active processing. They did not see learning as social participation and knowledge building. But in the second round of survey, students' view of learning became more multifaceted. The emphasis on learning as acquiring knowledge and active processing decreased. This implies that learners started to consider learning as social participation and knowledge building.

The class's level of knowledge co-construction was also coded using the interaction analysis model (IAM) proposed by Gunawardena, Lowe, and Anderson (1997). IAM has been adapted by Chai and Tan (2009) to analyse discourse of a group of teachers who were engaged in a series of professional development courses. The IAM model is appropriate because of its roots in social constructivist theories of learning, and variants of it has been applied in online interaction analyses (e.g., Garrison, Anderson, & Archer, 2001). The five phases are: (1) Sharing or comparing of information, (2)

Discovery of dissonance or gaps in understanding the inconsistency among ideas, concepts, or statements, (3) negotiation of meaning or co-construction of knowledge, (4) Testing and modification of proposed synthesis or co-construction, and (5) Agreement or applications of newly constructed knowledge. Figure 4.4 shows the changes of the five phases over the sessions.

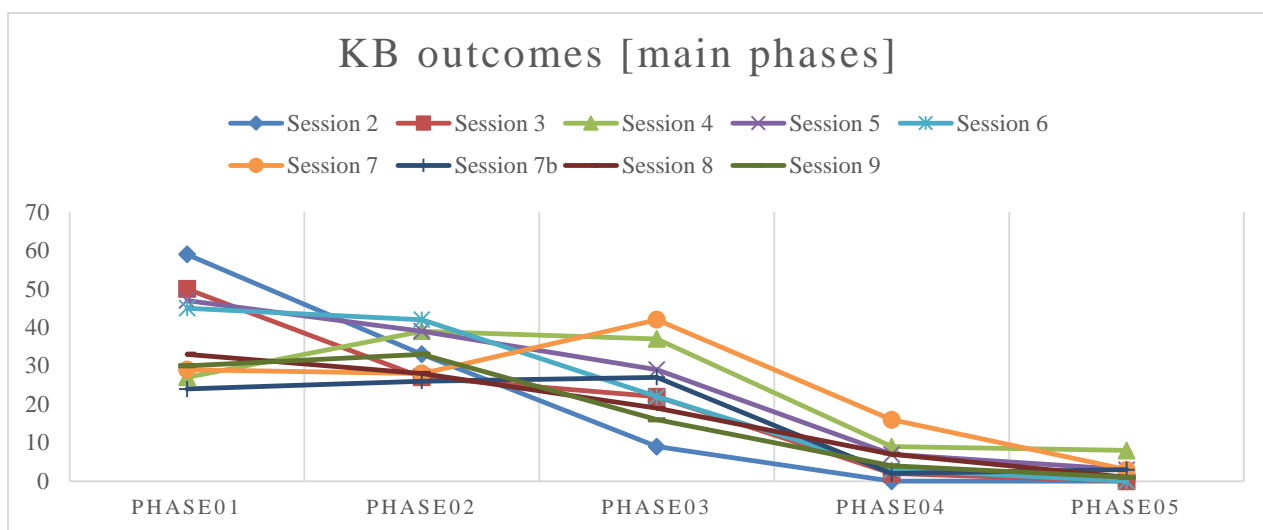


Figure 4.5. Frequency count of notes at different phases of interaction for different sessions

As expected, overall, the graphs show a progressive decline from Phase 1 to Phase 5. This trend occurs because sharing and comparing information (Phase 1) to reveal gaps or dissonance (Phase 2) takes greater time than acceptance of new knowledge (Phase 5). Negotiation of meaning (Phase 3) follows from Phase 2 leading to testing of new ideas (Phase 4) and finally acceptance of newly constructed knowledge (Phase 5). Learners generally spend less time in each progressive phase, hence the downward trend in Figure 4.5. That said, iterative changes and the knowledge co-construction may not progress in a linear fashion.

Among the sessions, 7a and 7b showed slightly different trends where it peaked at Phase 3 (negotiation of meaning) which is higher than Phase 1 (sharing or comparing information) and 2 (discovering gaps). The topics discussed in 7a and 7b are “principles of knowledge”, which relates to the design principles of knowledge building. It lasted two sessions because there were 12 principles to discuss. By this time, learners had already experienced knowledge building for more than 7 weeks and were very active in the online discussions. Examining the content of the discourse, it is apparent that they already knew the list of the principles and had already discovered some of the dissonance or gaps. For example, the group leading the discussion started with the question “What are some practical ways of preventing KF from becoming an information “bulletin board?” This is already a question stating the dissonance. Learners had also moved quickly to implementation issues, such as the roles of educators in knowledge building. Some were also aware of the use of analytics by the educator to examine the class’ discourse, and such applications were also discussed. In short, learners had sufficient experience and fundamental knowledge about knowledge building and were ready to discuss more advanced issues related to knowledge building.

Session 4 also shows a similar trend as 7a and 7b. The topic for Session 4 was “Affordances of CSCL”. Some of the learners have learnt about the concept of “affordances” in a previous course, and had moved the discussion quickly to more in-depth issues such as context-dependency of affordances and differences between affordances and constraints. Because of this, we saw a peak of Phase 3. Unlike the case of Session 7a and 7b, not all learners were as familiar with the topic of affordances, and therefore we saw a similar peak of discussion at Phase 2 (gaps and dissonance).

So, how does the process for knowledge co-construction occur, as perceived by learners? Sandra shared that various members in the group took on their natural roles in the dialogic discussion. One group member was good at consolidating discussion points, another was good with explanation, and yet another was able to provide examples. In short, the members played complementary roles that helped the team to progress. What are the outcomes of learning? Learners shared about *what* their conceptual changes of learning were, as well as changing conceptions of *how* learning occurs, particularly with respect to co-construction of knowledge.

What is more critical is whether or not learners experience first-hand being a knowledge-building participant in the dialogic learning environment and whether this experience changed them. Diane affirmed this by reflecting on the experience, “we get to experience what it is like, you know, building knowledge as a community, versus, you know something that you read from the paper...first-person experience thing that, you know, causes the change.” This corroborated with the peak of Phase 3 of IAM as shown in the Figure above. Sandra shared that the task for groups to lead in the seminar discussion provided opportunities for the group members to work together. Various means of collaboration were explored, beyond the Knowledge Forum,

When we were preparing, we used to video conference and we used to have some long discussions. Although we used to split up our work, so “cooperated” our work, but finally, we used to spend an hour or two to really make sure everything is in line and all of us are synchronized to the same understanding and things like that.

To many learners, their personal experience has helped to shape their perception about learning, particularly their approach to co-construction of knowledge. Nolan shared that questioning is key to this process, “I keep on questioning, how come it (knowledge building) works here how come it doesn't work here?” This also corroborated with the high frequency of Phase 1d (asking question) of IAM, as discussed above. The discussion in Knowledge Forum and in class generated more questions,

have open-ended questions as to how else we can do certain things, so that we - well we answer the key areas... but we also open to other things that is beyond that. But somehow, that's why during the presentation there's still a lot of questions that I have in mind.

Questioning moves inquiry and provides the impetus for inter-subjectivity. Quentin suggested that questioning is critical for the discursive approach to learning: “after you present you discuss and you figure out questions, ask each other questions and that did help a lot. So that approach is more discursive and I think discursive approach works with me...” Quentin felt that it was not an easy task to facilitate such an approach: “I guess it also relies on the professor being astute enough to pick up what might be the questions to prompt people. I think a lot of people would have difficulty using this approach.” Quentin also opined that learners need to develop the competency to work productively in a dialogic learning environment: “you learn to also have some competence in that area of - of having that discussion and clarifying certain questions and pushing forth a position or a point that you feel is more important than the current interpretation that the class has.”

Quentin further proposed two conditions that have helped in the learning: linking experience with theory, and concept mapping. To Quentin, the dialogic process has provided the students an avenue to “look from practice and see how it relates to theory and then deepen your understanding”, rather than trying to read and thoroughly understand a theory before applying it. The dialogic process also generated questions and revealed the gap in understanding, and prompted one to probe the relationships among concepts. The concept mapping activity helped the learners to be more aware of their learning of the subject matter knowledge. Quentin reflected that the initial strategy for concept mapping was to “add on” the new concepts learn to the map, but after the third attempt, it became “clearer to see how things might intersect, how things might inter-connect, how things might

interrelate.” In other words, Quentin found it meaningful to find relationships among new concepts learnt and those that have been constructed. When constructing a concept map, such relationships are clarified. For example, “how is collaborative learning linked to knowledge building?” This question was bothering Quentin for some time and there was a serendipitous discovery that the relationships were clarified in the concept maps that he/she constructed.

Dylan shared the importance of communicating clearly and to accept disagreement as part of the process: “when you publish certain things, some people, definitely there will be people who do not agree with what you actually write.”

Learners had different views about the assigned grouping. Quentin shared that coming from a program with cohort structure, the peers from the same program had been a valuable source of support. Even though these peers were assigned to different groups in this class, they still consulted one another and used other chat applications for discussion. Nolan revealed that learners from the same programme organized themselves in a chat group (self-organized group), but he was “busy-body” enough to be invited to this group and benefited from the chat group, even after the completion of the course.

To Diane, however, the assigned group members took a while to get to know one another, but having this small group helped in the process of knowledge building. Likewise, Thomas shared how his group evolved over the duration of the course, developing empathy along the way rather than just being task-focused:

Yeah I think the group evolved from a very task orientated, we want to finish... then after that we know that some members have some struggles with families, then never mind, we tend to understand each other, more on the learning but other things about... so we help each other out.

“In such a learning environment, those learners who are better at trying to incorporate a lot of what the others have mentioned they have learnt, it really helps to elevate the quality of the assignment,” shared John.

4.5. Conclusion: Learning design, inquiry and knowledge building

In the Introduction section, the design rationales and principles for this course was explained. In essence, it was designed to appeal to adult learners by giving them agency and control over the learning processes and topics for inquiry, and more critically, engage them in collaborative meaning making and tapping into their rich experiences as resources for learning. Did the students noticed these learning design? Some learners apparently could discern the differences in learning design between this course and the “traditional” approach. Quentin summarised the main differences of how this course was structured and executed, compared with other courses:

The first would be use of technology... I think this one the technology used was more interactive and more participative, and there’s a stronger self-directed component as compared, other ones were more directive. They tell you what to do and we did, what you expected to do we did and how you will do things with it. I think for this one there’s more possibility and more free play. And it’s really up to you to really deep dive or do something more surface, or just do the required as spelled out in brief. I think the second one is I think there was also express grouping right at the start. Most of the courses I’ve attended, NIE at least, they only group later in the course. They rarely group on the first lesson. So there’s definitely more collaboration, expectations from day one...I think the third, of course, would

be because we have two tutors... I think their styles were also quite different. The courses I've attended so far are usually here's the reading list, you will all take five, you all will present and you will all do activity after that, you will write reflection after that. So I think this one was a bit different. This one requires us to discuss in groups sometimes, do offsite discussions and then present findings either online or in person. And there was no express need to be assigned a reading and present it and oh, teaching session workshop.

In short, the technology used (Knowledge Forum) was meant to mediate collaborative learning, rather than delivering content; there was a lot more self-directedness needed in this course; there was a strong expectation for collaborative learning; there were two educators facilitating with different styles; and there was no assigned reading and assigned presentation, and less strict scripting (structure) about what to do in each lesson.

Summarising the discussion, in general, the learning design that learners appreciated in this course include the following:

- a. Some learners appreciated the multiple voices, multiple perspectives and shared control in learning. Consequently, some learners felt more engaged in this course and more self-directed, compared with other more "structured" courses that they have experienced.
- b. The learners acknowledged learning through the online forum was a novel experience, and some liked the feedback from the analytics.
- c. The constant questioning by educator and peers that prompted inquiry and deep learning.

On the other hand, it is important to acknowledge some challenges faced by the learners so that appropriate measures could be taken in future learning design:

- a. Getting used to the "less structured" approach and uncertainties about how to perform well in this course.
- b. Confusion caused by multiple voices and presence of information that were perceived as irrelevant.
- c. The lag-time in getting responses in asynchronous mode of discussion.
- d. The pressure of contributing relevant and promising ideas useful to the discussion.
- e. The high cognitive demand partly contributed by knowledge building and partly because of the concept mapping activities.
- f. Handling group processes such as course mates who dominated the discussion.
- g. The tension between competition and collaboration.

Despite these challenges, these were positive changes brought about by this course:

- a. Changes in perception of learning from a predominantly acquisition perspective to include participatory and knowledge creation perspectives.
- b. Deepening of understanding as reflected in most concept maps.
- c. Progressive phases of knowledge co-construction as shown in the analysis of group discussion using IAM.

In summary, the reflection on inquiry, construction of concept maps, learning design conducive to eliciting multiple voices and multiple perspectives, and first-hand experience in knowledge building constituted an overall learning environment that engaged the learners in dialogic inquiry and knowledge building.

5. Rising Above

In this chapter we summarise the findings and expand on and further abstract (rising above) what we learnt from the findings chapters. Rising above is a reference to improving ideas and abstracting at higher levels, the process we undertake in the second part of this chapter – hence our title for the Chapter.

Findings from the cases discussed in the previous two chapters illustrate similar experiences for learners of the dialogical teaching and learning process, both in terms of challenges they experienced, and of their valuing of the dialogical teaching process.

Overall, learners deeply valued the dialogical teaching approach that afforded them the opportunity to clarify, question, interpret, and work with different kinds of evidence to co-construct knowledge amidst multiple perspectives and voices. Developing deep understanding was facilitated through curriculum design and structure that used authentic issues selected by individual students in the case of WPL&P and selected by groups in the case of CSCL&KB. In addition, entwining the learning process with assessment (summative, formative and sustainable assessment) (Bound, Chia & Karmel, 2016), modelling of processes required, scaffolding, the use of mini lectures to provide initial ways of thinking about concepts and how to marry theory and practice were important in developing deep understanding. Paying attention to emergent and deepening meta-cognitive processes involved in dialogical inquiry and knowledge-co-construction processes was facilitated through the use of tools such as the Map of dialogical inquiry and concept mapping where learners could see changes and growth in their understandings and expansion in their ways of thinking overtime. Importantly the changes in identity as learners is a powerful outcome that positions learners well for facing future, unknown challenges.

Challenges experienced by learners were also similar across both cases, with some being specific to the kinds of spaces being used, and that are part of learning to learn in such spaces. The perceived lack of structure was because the teaching and learning processes were new to learners; they did not 'see' the structure because they had not previously experienced it and thus did not recognise it as structure. This suggests it would be useful to make the structures more explicitly visible by pointing out the structural elements; for example, the flow of the curriculum, the knitting together of learning and assessment, the use of space, the collection of primary and / or secondary evidence, the IAM processes and so on. The need to apply theoretical constructs as they worked with their authentic problems was perhaps one of the biggest challenges learners experienced. Explicit scaffolding is required to enable learners to marry theory and practice – something the educators have paid specific attention to subsequent runs of the same courses. However, that this was an issue that learners particularly struggled with, highlights the problem of teaching concepts that students only write about in an academic way without being required to apply these concepts. Similarly, confusion caused by multiple voices and perspectives lays bare their previous experience that they specifically commented on, where the demands of previous courses require a particular kind of reproduction, typical of monologic design and facilitation. Such comments along with comments on the amount of work required, including the readings, suggest a high cognitive and thus emotional load for learners as they grapple with much that is different. Sustained experience of dialogical teaching is likely to reap benefits over time as the cognitive load decreases. This suggests that when programs are planned and designed such approaches need to be deliberately woven through the whole program, rather than in single courses.

Despite the challenges and struggles, students valued this approach. Dialogical inquiry and teaching, be it as a total approach or using the various pedagogical techniques, ranging from for example, , using authentic problems, establishing norms of dialogue, questioning, educator throwing questions

back to learners, meaning-making together, applying theory to practice and vice-versa, structuring for dissonance, multiple perspectives etc., can contribute to lifelong learning and 'mastery' (SkillsFuture, 2015). The ability to work with multiple perspectives, to be creative, to be able to offer and receive true critique and develop creative solutions are all hallmarks of knowledge workers. Dialogical teaching offers an important alternative to monologic teaching; it is the former that better meets the needs of today's, and the future workforce.

In the following section we move from comparing the two case studies, to exploring what our findings mean conceptually, building on Wells (1999) spiral of knowing.

5.1. "Rising above' the two case studies

Using the vernacular of knowledge building, this section is a "rise above" of the two case studies; in which we seek to develop a deeper understanding of dialogic teaching based on the evidence analysed in the previous two chapters. In this section, we examine, from course design and the experience of learners, key elements of dialogic teaching and learning that have worked well in the courses. These have implications for designing and implementing dialogic teaching approach for adult learners. We will also examine challenges faced by learners and the educators, and the possible ways to resolve or reduce some of the hurdles for dialogic teaching.

In developing our model of dialogic teaching, we consulted the spiral of knowing proposed by Gordon Wells (1999), who held that

Knowing starts with personal experience which, amplified by information, is transformed through knowledge building into understanding, where understanding is construed as knowing that is oriented to action of personal and social significance and to the continual enriching of the framework within which future experience will be interpreted (p. 85).

Wells' spiral of knowing involves several key elements: experience, information, knowledge building, and consequently enhanced understanding, all of which were discussed in the previous two chapters. However, we found that deepening of understanding involves meta-cognition and can contribute to changed identities either as a learner and/or as a particular type of practitioner. We consider these to be outcomes that grow and develop through multiple iterations and opportunities, as shown in Figure 5.1 which we have called the dialogic teaching model.

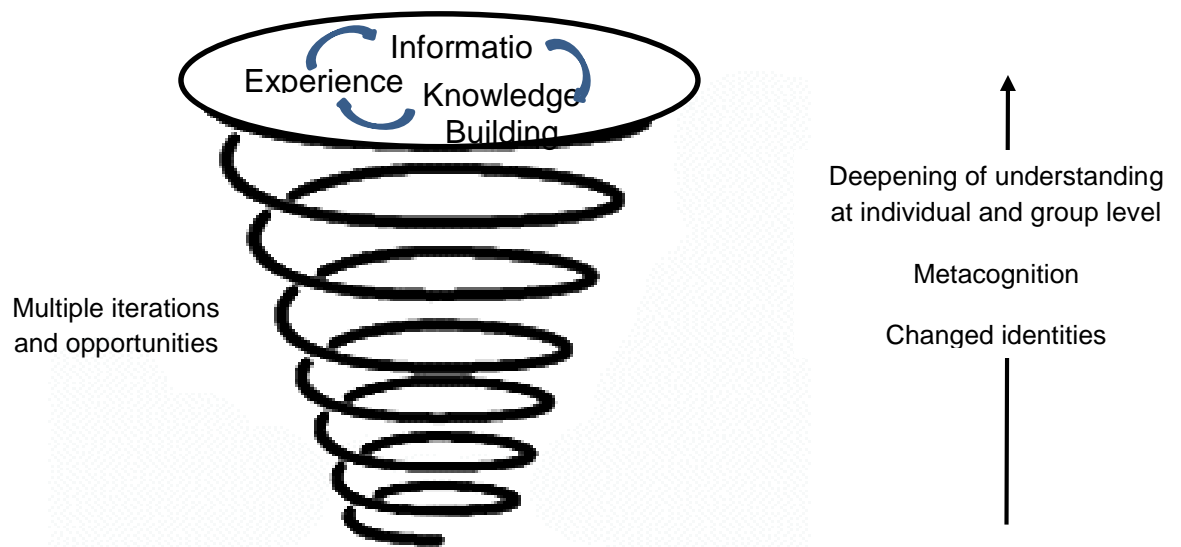


Figure 5.1: Dialogic teaching model

The remainder of this chapter discusses the elements in the diagram (experience, information, knowledge building and deepening understanding), concluding with how to address the challenges students faced as they experienced dialogical teaching.

5.2 Experience of learning

The course design provided the learning **experience** for learners. Essentially, *solving authentic problems or discussing authentic issues* through processes of inquiry form the key components of this experience. In the course CSCL & KB, academic papers served as the trigger materials for discussion. In WPL&P, the authentic issue was the learning issue or problem students identified in their own workplace, that they had to further analyse based on data and develop solutions for. In CSCL & KB one good example was the discussion of the concepts “affordance” (or enablers) and “constraints”, which are the conditions to facilitate learning. In the meaning making process, learners brought in personal experience to illustrate these concepts. For example, one learner wrote: “The telecommunication device I used as a student was a pager... completely different from my iPhone now. The classroom I had as a student sad to say isn’t much different from the classroom I had as a teacher in 2017.”

The *learning space* is another critical element that supports the dialogic teaching and learning process. In both courses, the physical environment is designed for learners to sit in groups, this contributes to the implicit message that group work is expected. In CSCL & KB, this was coupled with the immediate assignment of learners into groups in the first lesson, making apparent the valuing of group work. In this course, the Knowledge Forum provides the complementary cyberspace for collaborative learning. Coupled with the feedback by the educator on the good ideas among learners and the productive ways to communicate with one another, learners aimed to contribute useful ideas to the community and began to value one another’s contribution. More critically, the weaving of the two modes of instruction (face-to-face and online) suggests a seamlessly blended learning environment rather than two separate sets of activities. WPL & Performance also involved multiple different collaborative spaces as detailed in Chapter 3, setting up different physical and conceptual spaces that contributed to different kinds of dialogue.

5.3. Information – Multiple Voices and Perspectives

Aligned to the goals of dialogic teaching, in both courses, multiple voices and perspectives among the learners and the educators are valued. Specifically, sources of information include and extend beyond the traditional academic research papers introduced by the educators, learners are encouraged to introduce other academic papers they deem relevant to the discussion. Critically, learners' personal experience (at workplace or other contexts) are also deemed as legitimate sources of information. The value of respecting others' ideas was emphasized in the attempt to create a democratic environment for contribution by all learners. In CSCL & KB this is manifested in empowering groups to take turn in leading discussion, highlighting interesting and valuable ideas from the learners (by the educator and by the peers), as well as learners suggesting relevant reference materials. In both courses, developing trust in each other to openly share information and resources was a little slow in the beginning, but approximately one third of the way through the course, learners were realising the necessity for and value of such sharing, which deepened over the remaining weeks. One main feedback from learners was that questioning was important in driving their discussion, and being active in posting their questions. Many learners valued the questions and multiple perspectives from their peers, which nudged them towards deeper exploration of the issue or concept being discussed.

5.4. Knowledge building – shared control and meaning making

Knowledge building principles underpin the design of the course CSCL & KB, as shown in Table 4.1. It is centred around their ideas, discussed in the previous section on multiple voices and perspectives. Other key values to be highlighted are ways for productive meaning making, which is related to having shared responsibilities in the community's idea improvement. In one of the sessions in this course, the principle of knowledge building discourse was discussed. Essentially, this entails the skills and disposition of listening carefully to others' contribution, valuing others' perspectives, and finding ways to incorporate different ideas towards building ideas. Having shared control (not dominated by the educators or individuals) is critical, and more importantly, developing the sense of shared responsibilities in achieving the community's goals. This is manifested in learners' reflection that they want to contribute notes that are meaningful and notes that will lead to sustained discussion. In one of the sessions, a student suggested building a Community Resource Bank

The Community Resources Bank sounds like a great idea. If everyone contributes to the resources bank, all will be able to learn something from there... [I need to understand] What are some strategies that I can apply to make Community Resources Bank successful in our typical classroom learning?

The WPL and Performance course had similar outcomes, despite knowledge building principles being less foundational in the design of the course but as intrinsic to the inquiry processes. Learners were required to collect empirical data and analyse it, through a combination of individual work and many opportunities for sharing stories, interpretations, and possibilities for solutions considered through different lenses, such as integral theory. Meaning making, not just of the identified workplace issue, and the data collection processes, but of theoretical perspectives and possible solutions and how these are informed and shaped by different theoretical perspectives (e.g. human capital and socio-cultural perspectives) evolved over the time of course and as learners were completing their final assignment. Figure 3.2: Changes over time in significant aspects of dialogical inquiry, clearly illustrates growth in theorising, analysing, reflecting, applying which are suggestive of active meaning making.

5.5. Multiple iterations and opportunities

The spiral in Figure 5.1 illustrates the provision of multiple opportunities for learners to go through iterations of experiencing and knowledge building. In the course CSCL & KB, the course structure followed the “script” of (a) Introducing a new topic → (b) online discussion → (c) bringing discussion to classroom → (d) summary and rise above → (e) Starting a new topic. As mentioned earlier, this structure weaves learning in the cyberspace and physical space, but more importantly, it provided multiple opportunities to deepen the conceptual understanding of learners. The structure of the WPL and Performance course was less explicit, but highly iterative. Through the ecology room learners were introduced to many of the concepts they would revisit later as they undertook readings and engaged in repeated opportunities to discuss. Discussion focused on, first, the identification of a workplace learning issue, then the design of their data gathering exercise, analysis of their data and finally of possible solutions. In this way they grew in their width and depth of understanding. Additionally, a number of different theoretical frames were used, such as integral theory, to provide opportunities to examine issues from different perspectives.

Provision of multiple opportunities is critical, as learners suggested that it took time to get used to the dialogic mode of learning. Without sustained *experience*, the students might not reap the benefits of this approach of learning.

5.6. Learning outcomes

The iterative cycles of experience, gathering information from multiple agents and perspectives, and knowledge building eventually lead to the learning outcomes, which include (a) deepening of understanding of the learners, at both personal and group levels, (b) metacognition of the process of learning, and (c) changed identities of the learners.

5.6.1. Deepening of Understanding at Personal and Group Level

For the course CSCL & KB, all the students achieved Grade B and above for the course assessment. It was definitely a demanding course as reflected by the students, but the hard work eventually paid off. Deepening of understanding of the subject matter knowledge was indicated by the learner’s concept maps, as shown in Figure 3.6 and Figure 3.7. The students suggested that the concept mapping exercise provides the opportunities to examine how various concepts are related. At the group level, coding using the interaction analysis model (IAM) (see Figure 4.4) showed how the groups progressed in the co-construction of knowledge. The knowledge building process has facilitated this co-construction of knowledge.

In the WPL and Performance course, learners’ concept maps and the reflections discussed in Chapter 3 are illustrative of growing capability in making connections between ideas, and deepening understanding. For example, there was evidence of shifts in ways of thinking about learning from occurring in classrooms, facilitated by an educator to learning as a social activity that occurs formally and informally, through structured and unstructured actions and activities.

5.6.2. Metacognition of the process of learning

Beyond the cognitive gain in terms of subject matter knowledge, the knowledge building, concept mapping and rating of inquiry (inquiry map), specific activities also provided opportunities for learners to develop metacognitive awareness of their learning process.

Metacognition, pioneered by John Flavell (1979), refers to "knowledge and cognition about cognitive phenomena" (p. 906). It comprises four components: "(a) metacognitive knowledge, (b) metacognitive experiences, (c) goals (or tasks), and (d) actions (or strategies)" (Flavell, 1979, p. 906). Brown (1987) also identified two related dimensions in metacognition: (a) knowledge of cognition, and (b) regulation of cognition. In the course CSCL & KB, interviews with the students revealed their reflection on their learning. These include the awareness of the challenges they faced (e.g., adapting to the new mode of learning), the new values they gained about the learning approach (e.g., appreciation of multiple voices and perspectives), the new mind-set they developed (e.g., responsibility to post notes that are meaning to the peers), and the suggestions they provided (e.g., showing the use of analytics earlier in the course). Figure 3.5: Relationship between Reflection Types & Course Scores, illustrates the value of metacognitive processes and of the relationship between meta-cognition and reflection. The statistically significant differences in WPL and Performance learners' Maps of Inquiry, over time (Figure 3.2), along with their reflections indicated growing awareness for example of an ability to theorise and analyse (knowledge of cognition). Additionally, as learners grappled with different expectations, moving from being passive learners to active and agentic learners, their focus and contributions to group discussions changed from one of complaint to working it out (regulation of cognition).

There are ample examples that indicate learners had and further developed metacognitive knowledge and were able to regulate their personal learning behaviours to adapt to the new mode of learning.

5.6.3. Development of new identities

Eteläpleto (2015) argues that, 'professional identities are negotiated at the intersection of the individual and the social' (p. 40). The development of identity is a continuous process, produced through the practices and the contexts we engage in (Bound, Sadik, Evans & Karmel, 2019). Identity combines competence and experience and develops our 'ways of knowing'. It determines what matters to us, with whom we share information and who we decide to trust. As Du Gay (1996) notes, 'any identity is basically relational to its conditions of existence, any change in the latter is bound to affect the former' (p. 184).

In the two courses, conditions were not only different from previous experiences in the respective programs, but evolved as learners contributed to the creation of more supportive, trusting interactions. Learners' ways of knowing themselves as learners is perhaps the most notable change in identity through engagement in the dialogical teaching process. Additionally, in both courses learner's identity as a professional (teacher, human resource practitioner, lecturer, and so on) variously changed. For the course CSCL & KB, the new identities of the students are reflected in their view about learning and their reflection on how they overcame challenges they faced in this course. Figure 4.3, shows clearly that all regarded learning as acquiring knowledge and active processing of information. The analysis in Chapter 3 for the WPL&P course, provided a number of example of learners' change in identity as learners. For example, Flora's surprise that the process of debate and critique means there is no one single, "perfect answer". Holly's realisation that she *can* analyse and theorise marks a shift in her self-perception, her identity as a learner and also as a practitioner. By the end of each course, there was a large increase in views about learning through

participating in discussion and doing, as well as learning through working on knowledge artefacts (learning through knowledge creation) and through inquiring into authentic problems. Additionally many of these learners were empowered through their development of a learning intervention that, despite not being a requirement, were implemented during or after the course.

Learners raised numerous challenges they faced in these courses, but many eventually saw the value of being challenged by questions, the implicit structure of the courses, the need for a paradigm shift, the need to prepare for the lesson, and for CSCL & KB, the need to post notes that are meaningful to others.

5.7. Challenges faced by learners and the educators

Learners raised several surprises and challenges they faced in these courses that were designed and taught using a dialogical teaching approach. In both courses, these challenges included:

- a. The radical departure from the traditional lectures;
- b. The “lack of structure” of the course;
- c. The unpredictability and emerging nature of the discourse;
- d. The sheer amount of work needed, including the readings;
- e. The different expectations and roles they were expected to undertake;
- f. The level of difficulty in identifying and naming a workplace learning problem (WPL&P);
- g. The competition to post notes recognised by peers (CSCL & KB);
- h. The anxiety of waiting for responses in the asynchronous online forum (CSCL & KB); and
- i. The stress of being assessed on group construction (which is not predictable) (CSCL & KB).

Several reasons could be used to explain these perceptions: (a) the cognitive dissonance of experiencing a new script about doing a formal course; (b) learners’ view about learning (epistemology); (c) their identities as a learner, and (d) their views about the legitimate roles of the educator and learner. These factors are related, for example, how learners view learning is likely related to their views about the roles of educators and learners. Despite these challenges, the above discussion shows that through iterative opportunities of experiencing and knowledge building, most students eventually appreciated the values of such an approach, deepened their knowledge and even changed their identities as learners.

Turning our attention to the educators, facilitating dialogic teaching calls for a fine balancing act (see Tan & Ku, 2014), that includes making decisions about:

- Being the only ‘voice’ that structures the knowledge, compared to providing iterative opportunities for learners to take on this responsibility;
- The degree of scaffolding to provide
- Handing over control to and empowering students yet retaining enough control

For example, if the issues of discussion are always prescribed by the educators, the problems may not be seen as authentic to the learners. Similarly, if the lessons always conclude with the educators having the final say on the issues discussed, learners often just wait for the final verdict instead of putting forth their ideas, contributing to a negative sense of learner agency. As discussed in Chapter 3, if the educator is the one who answers student questions, this can effectively silence the contributions of learners. Whereas throwing questions back to the group to consider demands their attention and contributions. The educator's beliefs about learning are critical to the success of using a dialogical approach. An acquisition (Sfard, 1998) model of learning where learners 'acquire' knowledge as a product, from the educator, positioning the educator as *the* source of knowledge, *the* authoritative voice will not enable the use of dialogic teaching. The dialogical teaching process implicitly understands learning as an iterative social process, involving access to multiple perspectives, and resources and empowering learners as authoritative voices. Perhaps the biggest concern for educators is the issue of power and the shift in roles of educator and students required, as discussed in Chapters 2 and 3. As educators, we can learn to become comfortable as one contributing voice, with a shift in power relations, sharing power with our learners. However, as we are ultimately responsible for the final assessment decisions, dialogical teaching requires a significant, though not equalising of power relations between educator and students.

Hong and Scardamalia (2014) have advised to use principle-based design for knowledge building lessons. What this means is for the educators to guide learners following the principles of knowledge building (see Table 4.1), rather than following prescribed procedures for instructions. This requires constant assessment of learners' behaviours and their progress of inquiry, making decisions about how to steer them towards the productive path. Metaphorically, it is like a skilful driver who constantly judges the road and traffic conditions, gets information update from GPS, and decides which routes to take from Point A to Point B, rather than taking a predetermined route regardless of the situational conditions.

One approach an educator can take is, for each principle, develop a suite of instructional tactics that work under different situations. For example, using different strategies to elicit authentic problems from the learners (e.g., getting students to talk about their experience, using a video clip that depicts a situation in classroom, sharing an article that presents a controversy). Over time, the educator can build up a repertoire of strategies that he/she can flexibly use. Alternatively, the course can be designed around learners' individual workplace problems as was the case in the WPL and Performance course.

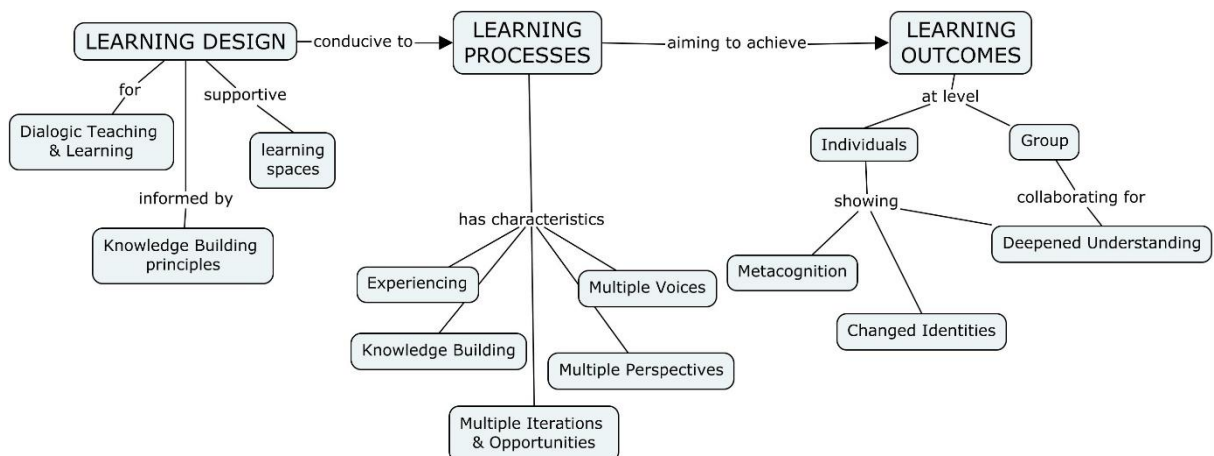


Figure 5.2: Concept map of the dialogic teaching and learning model

Integrating the empirical findings of the two cases, Figure 5.2 summarises the model of dialogic teaching and learning. We started with Learning Design that aims at providing learning environments conducive to the learning processes aligned to dialogic teaching and learning with the ultimate goal of achieving the intended learning outcomes. The learning design is guided by the broad goal of Dialogic Teaching and Learning that empowers learners with voices and shared control to shape their learning trajectory in the course. Knowledge building principles can be consulted to provide more specific instructional tactics, and the learning spaces (physical and cyberspace) could provide the necessary support for these processes.

The dialogic learning process is one that focuses on authentic issues or problems related to the topics of the courses. Learners experience first-hand the dialogic learning process characterized with multiple voices from learners who display the agency to provide multiple perspectives to the issues being discussed. They contribute to the knowledge building, a collaborative inquiry effort that aims at improving ideas. It is a process pervasive through the course such that the learners experience multiple iterations in an upward spiral process leading to deepening their understanding of the topics.

The learning outcomes include the cognitive gain in terms of deepened understanding of the topics, at both the individual and the group level. In addition, there are opportunities for learners to engage in metacognition of their learning processes so as to regulate their learning behaviours to adapt to a approach they are relatively less familiar to. Some learners experience a changing identity as a learner, seeing themselves as active agents contributing to and shaping their own learning journey.

6. Conclusion and Recommendations

In this Chapter we address the issue of how to support the uptake of dialogical teaching, not just within institutions of higher learning (IHLs) in Singapore, but also in the Training and Adult Education (TAE) sector. In addressing this question, we also add to discussion in previous chapters that address the final research question of, “What are the implications of the dialogical approach for the practices of adult educators?”

Recommendations are made from the understanding that dialogic teaching is one of a range of approaches that move away from monologic teaching. Key principles of dialogic teaching (and thus design of learning) are that:

- learners work with authentic problems / issues / tasks;
- assessment is based on authentic problems / issues / tasks;
- learners choose the authentic problems / issues / tasks they work on;
- learners engage in appropriate forms of inquiry (what the inquiry process involves varies from discipline to discipline and across vocations and professions);
- learners voice is valued as a source of knowledge building; and
- the role of the educator is to diagnose learners’ readiness for this form of learning, provide appropriate scaffolding, gradually handing over responsibility for learning and to move more into a provider of resources and guide.

Not surprisingly, there is often confusion about language used to describe various theoretical constructs and how it relates to particular approaches. This contributes to a common phenomenon in education, that of fads, such as flipped classrooms. Fads are often promulgated and implemented without there being a deep understanding such as discussed in the previous chapter of why or why not they may be useful approaches in particular circumstances. That is, the theoretical understanding (and with it the language of the ideas and concepts behind particular approaches) is missing. For this reason, Figure 6.1 sets out various examples of pedagogical strategies along a continuum from monologic teaching to dialogic teaching. It is worth noting here that the authors subsume learning design into teaching, so that ‘teaching assumes both the intended, enacted and also the experienced curriculum. Most practitioners move along the continuum to varying degrees, rarely being at one end or the other. The exception would be those who constantly lecture or read from scripts and are clearly at the extreme of the acquisition end of the continuum. Whatever the specific pedagogical practices of a practitioner, each practitioner will tend to have a set of beliefs and practices that places them more towards one end than the other.



Figure 6.1: Continuum from monologic to dialogic

In reflecting on practice, it is helpful to be able to recognise where along such a continuum one's practices and beliefs sit. This can be a first step to decisions in changing one's practice, and to trying out new approaches. The advantage of diagrammatic representations such as in Figure 6.1 is that it provides a language through which to describe what a practitioner has 'felt' but the practitioner may not have had the language to describe what may be a source of unease and the reasons why. Figure 6.2 expands the language and with it concepts that practitioners may find useful to talk about their practices. Having the language and understanding the reason why is necessary to change in practices and beliefs. The important things to remember about representations such as in Figures 6.1 and 6.2 is that they are representational, and metaphorical; that is, these representations will not exactly match any one practitioner's practices, rather they are a means of providing ways of thinking and talking about pedagogical practices. Practitioners always move along such continuums, the question is, where do they spend most of their time, and what does this say about their beliefs about learning, teaching and their perspectives of their learners?

In Figure 6.2, Sfard's (1998) metaphors of learning are placed on a continuum, alongside the monologic-dialogic continuum. The acquisition metaphor, explains Sfard is found in language such as "knowledge acquisition" and "concept development" that assumes the human mind is a container to be filled with certain materials and that learners own this knowledge. Freire (1972) calls this the "banking metaphor". "Once acquired, the knowledge, like any other commodity, may now be applied, transferred (to a different context) and shared with others" (ibid, p.6). This idea of learning as gaining possession over something is persistent and implicit in much of our traditional use of language to describe and discuss learning. The new metaphor, which she calls the participation metaphor, uses language such as knowing, reflection, communication, community, dialogue, inquiry, communities of inquiry, development through participation, democratic and so on. There is a shift, notes Sfard, from "having" as in the acquisition metaphor, to "doing". For example, "knowledge" is replaced with "knowing", an action word, referring to using, constructing and co-constructing knowledge in context. In the participation metaphor, context is implicit in learning and seen as offering rich possibilities for learning and participation in activities rather than accumulating "private possessions" (p.6). Learning

is conceived as a process of becoming a member of a community where the norms are negotiated by its members: participation is synonymous with taking part, being a part of... The acquisition metaphor stresses the individual mind whereas the participation metaphor focuses on relations between people and the contexts they are in; “the whole and the parts affect and inform each other” (p.6).

Sfard was very careful to point out that both metaphors are needed, even though they appear to be in tension with each other. These metaphors are indeed in tension with each other, and unlike Sfard, who was writing her seminal article some 20 years ago, the authors of this report take a socio-cultural and socio-material view of learning that provides a more nuanced understanding of learning that positions learning towards the participation end of the continuum. As Lee (2014) notes “cognition extends beyond the brain to the material world surrounding the subject-knowledge is in *and* out of the human body” (p.172). In other words, cognition is dependent on an individual’s relation to others, to things in the environment (the material world), including norms (such as the rule of raising your hand in a classroom to answer questions), dominant ways of thinking (such as learning is acquisition of knowledge), resources such as asking particular types of questions, theories, physical tools, and also, power relations. These can be felt in our bodies as for example when we ‘know’ a pancake is ready to be turned or we sense something is ‘right’; hence Lee’s reference to “knowledge is in and out of the human *body*” (authors’ emphasis). Sfard’s note that particular theories may be positioned towards a particular end of the spectrum is consistent with the explanation that the participation metaphor better represents the socio-cultural, socio-material theoretical perspectives and the acquisition metaphor is representative of cognitive perspectives that focus on the individual mind.

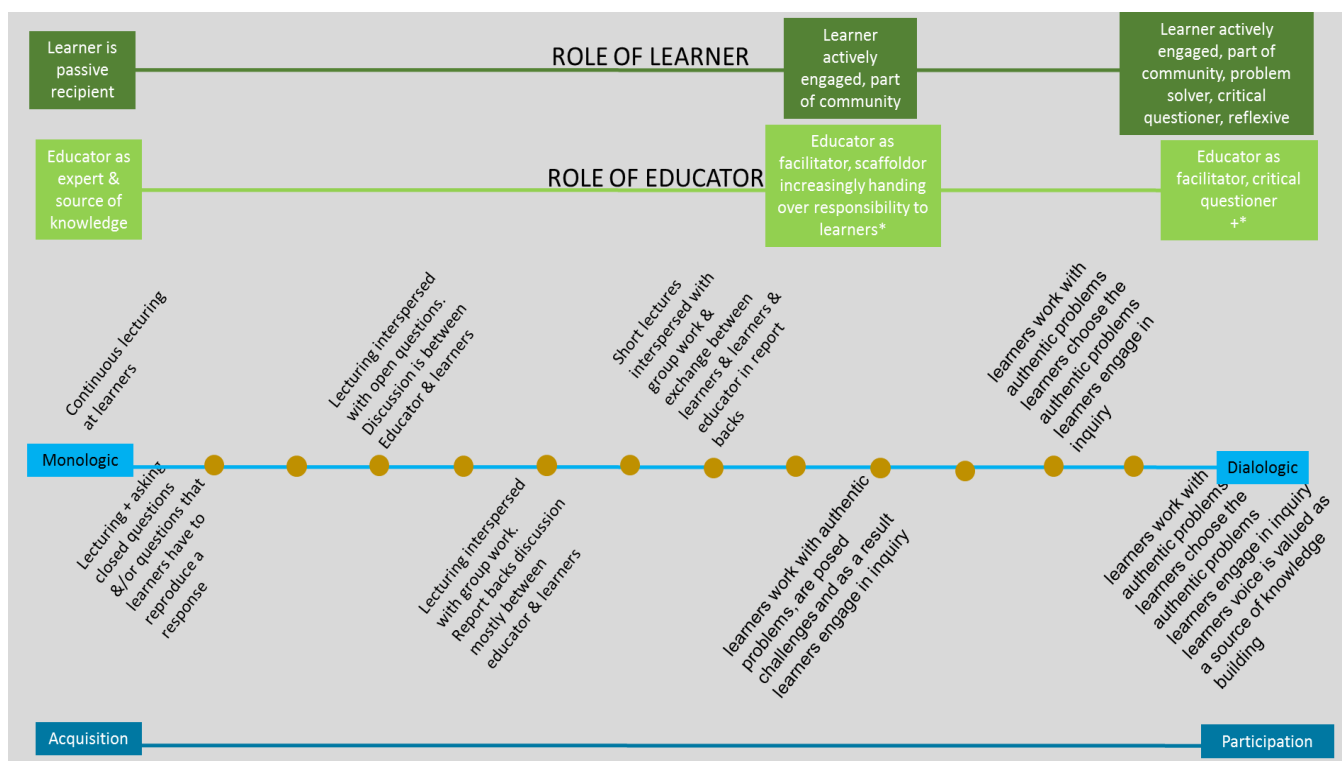


Figure 6.2: Roles and metaphors of learning in relation to monologic and dialogic approaches

There are many constructivist approaches that are inclusive of dialogue between learners. Educators will have had varied experiences with many of these approaches and can be confused about the difference between constructivist approaches that are typically enacted through the use of group work, (e.g. buzz groups, jigsaw activity, dating, etc.) and how that may differ from a dialogic approach.

The differences lie not just in the practices of educators, but in theoretical understandings and beliefs about learning, learners and teaching. Having said that, when considering these approaches on a continuum, there is no distinctive 'line' between them; there can be a blurring as practices are complex and can merge at the edges of different theories. It is however useful to try to unpick the differences to highlight what does distinguish one from another. The theoretical underpinnings are explained in the following paragraph (also see Chapter 2). The difference in practices are (amongst others) that, in constructivist approaches, it is usually the teacher who assigns the topic and or purpose of the discussion the learner does not choose what it is they work on; discussion is not necessarily related to authentic problems, issues or tasks and does not require praxis (integrating theory and practice), the learner is not viewed or heard as a contributor to knowledge creation/knowledge co-construction, and importantly, learners are not engaged in inquiry. Dialogic practices are underpinned by working with authentic problems, inquiry (encompassing dialogue), learner choice (degrees of learner choice could also be represented along a continuum) and knowledge creation / co-construction. The link between dialogue and inquiry is explained by Bound (2010):

Wells (cited in Audet, 2005, p.5) states that inquiry must be seen as an approach "in which the posing of real questions is positively encouraged whenever they occur and... all tentative answers are taken seriously." When we inquire, we move across different ways of thinking, often experiencing the accompanying emotions and sense of body. Inquiry may range from posing questions and experimenting with possibilities to challenging long held assumptions. Inquiry, therefore, encounters difference and a sense of being comfortable with difference. (Bound, 2010, p.109)

Others argue that inquiry is the use of research practices where learners gather evidence, analyse and interrogate it in relation to theory as part of knowledge creation that is important. This understanding certainly adds to authenticity, as in the WPL&P course. However, as in the CSCL & KB course, despite learners not collecting their own data, authentic challenges and questions were at the heart of the inquiry process.

An important aspect of building pedagogical capability is through being prepared to take risks, to use trial and error to provide a basis for reflecting on what worked, what did not, and why. However, a sense of permission from self and from system to try out different techniques and approaches is required. Consequently, we have recognised that there are three main challenges to implementing dialogic teaching approaches, or aspects of this approach:

- *The need for system change to support approaches such as dialogical teaching;*
- *Changes in the design of curriculum;*
- *Capability development of educators; and*
- *Individual educator agency in trialling approaches they have not used previously*

These focus areas are derived from our inductive analysis of the data to extrapolate issues that need addressing and are also based on the discussions held with stakeholders in the Project Reference Group meeting. This meeting, held on the 10th July, 2018, at IAL, specifically addressed the question of how to support changes in beliefs and teaching and learning practices. Stakeholders attending the meeting (n=23) included participants from the five Universities, four polytechnics, including from an academy within one of the Polytechnics, ITE, IAL plus adjunct adult educators and three other CET providers.

6.1 Individual educator agency

There are spaces and opportunities in every system for educators to exercise agency through being prepared to try out strategies and approaches they have not used before. There have always been such educators who deepen their pedagogical knowing through being prepared to take risks. The risk is less high stakes when the approach is grounded in empirical evidence as in the case of the dialogical inquiry approach. Where there is risk, there is potential for what is often labelled as failure. However, the individual and the team and system can continue to move forward by renaming 'failure' as something to analyse why, to seek further information and to try again based on further learning.

Educators who seek to constantly evolve their practice are often recognised and rewarded through strong positive student feedback, formal recognition of quality teaching, generally in the form of a certificate of excellence in teaching, and in various other ways. Provision of opportunities for these teachers to share their expertise and strategies varies across institutions, but a common approach is through observing their teaching. As discussed in the section on system change, recognition and reward of these individuals should be encouraged.

A tool useful for individual educators in gaining feedback on current or new practices they are trialling include Brookfield's (1995) critical incident questionnaire. This questionnaire includes questions such as, What surprised you? When were you most engaged?, When were you least engaged?. Such questions can be used by individual educators to gain feedback when considering change and when trialling new pedagogical approaches. Individual educators should be encouraged to try out different approaches.

The key message is that educators should feel empowered to try different approaches; even in quite restrictive systems there is room for individual practitioners to exercise agency through professional decision making.

6.2 Developing educator capabilities

Exercising individual agency can be encouraged with a growing sense of confidence and system support. In this section, the focus is on ways in which educator capabilities may be supported.

In the reference group discussion, this was an area that drew much attention. Some indicated that dialogical teaching was something they have been "pushing all the time" and "learners' are different now so educators must change". Here the discussion in relation to Figures 6.1 and 6.2 is pertinent. Understandings of dialogical teaching, of course varied amongst reference group members. Equating constructivist practices with dialogical teaching practices is a common misconception as discussed above.

Many of the stakeholders considered that educators in their institutions would need to develop the pedagogical skills and importantly the 'mindset' (beliefs about teaching and learning) to enact dialogical teaching. Comments such as the following expressed these concerns: "It's a higher level of facilitation. It's no longer just about managing within a fixed lesson plan", "There is a lot more of that classroom management, facilitation skill..." Reference group members also noted that systems that strongly support monologic approaches, are an additional barrier as they provide limited space for educators to try new approaches. Providing space for educators to try new approaches was considered an important means of change from the bottom up.

Most agreed that it would be important for educators to experience the power of dialogical teaching, to deconstruct what was happening, to learn the specific pedagogical strategies and to have spaces to experiment. Reference Group members were also very mindful of the identity shifts required and the need to be sensitive to changing identities. Educators, they commented, express their identity as

an expert each time they lecture, they need to feel comfortable with a shift of roles and redistribution of power in the educational setting.

The key message is that those responsible for professional development in their institution, provide the experience of the dialogical approach to their educators. That this experience be used to deconstruct what is happening for participating educators as learners, what it means for these educators as practitioners and to surface the sources of unease as identity shifts occur. These processes take time and a strong supportive culture.

6.3 Developing learners' capabilities

Developing learner's learning to learn, meta-cognitive and meta-thinking capabilities, enabling them to become more comfortable with dissonance, multiple perspectives, finding their voice, knowing how to ask critical, inquiring questions, using inquiry processes, being active meaning-makers and constructors of knowledge, go hand in hand with being confident self-directed learners. Developing such capabilities can be assisted through, for example:

- Program design that deliberately pays attention to developing these capabilities. At the beginning of a program, scaffolding is likely to be strong but responsibility is gradually handed to learners over the course of the program.
- Educators having deep pedagogical capabilities
- Curriculum design that entwines learning and assessment; uses authentic problems; provides choice of the learning problems to be addressed; that requires learners to integrate theory, practice and generic skills (holistic design); that provides opportunities for learners to make judgements and to give and receive feedback from multiple sources.

The key message is that the shift for learners from experiencing a monologic approach to a dialogic approach is considerable. The journey to becoming self-directed learners, responsible for their own learning and with good meta-cognitive capabilities needs to be supported.

6.4 Changes in the design of curriculum

While there are innovative approaches being designed across the different educational systems, stakeholders implied that the dominant approach is monologic. Some stakeholders raised issues such as, to what extent do curriculum designers understand learning. All stakeholders had some concerns about the need for 'mindset' changes about what teaching and learning is. Suggestions included moving forward in small steps for both educators and learners, focussing on various aspects of the dialogic approach.

Dialogical inquiry processes are built into curriculum design from the beginning of the design process. Specifically, as already stated dialogical inquiry means curriculum design:

- Uses authentic problems / issues / tasks;
- Base assessment on authentic problems / issues / tasks;
- Let learners choose the authentic problems / issues / tasks they work on;

- Encourage learners to engage in appropriate forms of inquiry (what the inquiry process involves varies from discipline to discipline and across vocations and professions);
- Value learners voice as a source of knowledge building; and
- Provide appropriate scaffolding for learners, by educators gradually handing over responsibility for learning and moving into being a provider of resources and a guide.

Curriculum designers unfamiliar with this approach may also require support and development opportunities.

6.5 The need for system change to support approaches such as dialogical teaching

Currently most systems such as performance management, recognition and reward systems, quality assurance systems, design of student evaluation, approval or accreditation of curriculum, the design of spaces, implicitly support monologic teaching approaches, with the unintended consequences of working against innovative pedagogical approaches. For example, reference group members raised issues such as the student evaluation forms restricting the trying out of different approaches due to concerns about receiving lower mean scores. This in turn impacts adjuncts in terms of the continuous flow of work and for permanent staff, impacts on their performance bonuses. Number of students in a class and also the design of spaces were also specifically mentioned.

Management in institutes for higher learning and private for profit training providers may be unaware of the impact of such policies. Governance processes are not neutral in their impact on pedagogical practices and can send powerful, intended or unintended, messages that actively support monologic pedagogies. Student evaluation forms can provide useful data to prompt both system change and / or changes in the practices of individual educators. Their design can encompass the valuing of learner engagement, authenticity, development of meta-cognition, holistic learning design and inquiry processes.

Current system approaches such as separating assessors and assessment from the educator, and curriculum design where separate individuals are given responsibility for design of separate courses in a program, entrench current practices rather than encourage innovative practices. Assessment and learning are entwined (see Bound, Chia & Karmel, 2016; Boud, 2000), as evidenced, for example, in the concept and practices of formative assessment. Separating the educator facilitating a course and the assessor who conducts assessment, privileges summative assessment and leaves little or no space for inquiry approaches. In the design of programs, allocating different educators to develop different courses within the program generally means the courses do not 'talk' to each other, and do not create a developmental path. Likely different pedagogical approaches will be utilised, making it difficult for learners to make sense of the program as a whole. Whereas a deliberate approach that values dialogical inquiry can gradually and intentionally build and develop learners' capacity for self-directed and learning to learn capabilities, necessary for dialogical inquiry processes.

The key message is for institutes of higher learning and training providers interested in moving towards dialogical teaching and learning, to take a relook at their systems. This requires hearing the voices of educators and of learners, and not being afraid to make changes.

6.6 Specific Recommendations:

- 1 That the researchers work with institutions that have expressed an interest in dialogical teaching to:
 - a. Develop a guide on dialogical teaching;
 - b. Design workshops to support the development of dialogical teaching approaches appropriate to the institution;
 - c. Explore with the institutional management, potential ongoing support mechanisms for educators;
 - d. Explore with the institutional management, how to recognise individual educator agency in trialling/implementing dialogical approaches;
 - e. Discuss with quality assurance teams how their systems can best support dialogical teaching approaches;
 - f. Design workshops for institutional managers on dialogical teaching, specifically in relation to c, d, and e; and
 - g. Work with like-minded educators who can take on the delivery of the workshops to ensure sustainability.
2. Data collection through course accreditation and student evaluation forms (e.g. TRAQOM), for example, could be designed to encourage dialogical teaching approaches by valuing learner engagement, authenticity, development of meta-cognition, holistic learning design and inquiry processes. Valuing these characteristics often means a redesign of such forms.
3. Assessment to be integrated into learning design and not separated from the learning and from the educator facilitating learning.
4. Design of new programs requires a team approach rather than contracting out to individual adult educators who are not brought together.
5. IAL could build in the principles of design of dialogical teaching into the courses that develop curriculum designers and across their programs.

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Appendix 1:

Dependent t-test results of comparing the inquiry domain scores of the first and last inquiry maps

Inquiry Domain	Inquiry Maps Compared	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Theorizing	First Inquiry Map vs Last Inquiry Map	-2.35	1.77	0.43	-3.26	-1.45	-5.49	16	0.0000
Imagining	First Inquiry Map vs Last Inquiry Map	-0.76	1.99	0.48	-1.79	0.26	-1.59	16	0.1318
Reflecting	First Inquiry Map vs Last Inquiry Map	-2.71	1.53	0.37	-3.49	-1.92	-7.28	16	0.0000
Relating	First Inquiry Map vs Last Inquiry Map	-1.88	1.11	0.27	-2.45	-1.31	-6.98	16	0.0000
Experiencing	First Inquiry Map vs Last Inquiry Map	-1.41	1.06	0.26	-1.96	-0.86	-5.47	16	0.0001
Procedural	First Inquiry Map vs Last Inquiry Map	-0.82	2.13	0.52	-1.92	0.27	-1.60	16	0.1302
Applying	First Inquiry Map vs Last Inquiry Map	-2.82	1.38	0.33	-3.53	-2.11	-8.44	16	0.0000
Analyzing	First Inquiry Map vs Last Inquiry Map	-2.47	1.55	0.37	-3.27	-1.68	-6.59	16	0.0000

Summary of Mean Scores (Selected Participants against Class)

Inquiry Domain	Maps Compared	Mean of Selected Participants	Mean of Class	Difference	Percentage Difference
Theorizing	First Inquiry Map	1.24	1.32	0.08	6.42%
	Last Inquiry Map	3.59	3.65	0.06	1.69%
Imagining	First Inquiry Map	2.29	2.32	0.03	1.12%
	Last Inquiry Map	3.06	3.30	0.24	7.31%
Reflecting	First Inquiry Map	1.53	1.64	0.11	6.74%
	Last Inquiry Map	4.24	4.30	0.06	1.50%
Relating	First Inquiry Map	1.65	1.60	-0.05	-2.94%
	Last Inquiry Map	3.53	3.65	0.12	3.30%
Experiencing	First Inquiry Map	1.53	1.48	-0.05	-3.34%
	Last Inquiry Map	2.94	3.10	0.16	5.12%
Procedural	First Inquiry Map	1.82	1.64	-0.18	-11.19%
	Last Inquiry Map	2.65	2.90	0.25	8.72%
Applying	First Inquiry Map	1.35	1.48	0.13	8.59%
	Last Inquiry Map	4.18	4.15	-0.03	-0.64%

Analyzing	First Inquiry Map	1.82	1.92	0.10	5.02%
	Last Inquiry Map	4.29	4.40	0.11	2.41%

Appendix 2: Dependent t-test results of comparing the inquiry domain scores of the first and last inquiry maps

Inquiry Domain	Inquiry Maps Compared	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Theorizing	First Inquiry Map vs Last Inquiry Map	-1.00	1.11	0.30	-1.64	-0.36	-3.37	13	0.005*
Imagining	First Inquiry Map vs Last Inquiry Map	-0.93	1.73	0.46	-1.93	0.07	-2.01	13	0.066
Reflecting	First Inquiry Map vs Last Inquiry Map	-0.79	1.12	0.30	-1.43	-0.14	-2.62	13	0.021*
Relating	First Inquiry Map vs Last Inquiry Map	-0.43	1.45	0.39	-1.27	0.41	-1.10	13	0.290
Experiencing	First Inquiry Map vs Last Inquiry Map	-0.57	1.09	0.29	-1.20	0.06	-1.96	13	0.071
Procedural	First Inquiry Map vs Last Inquiry Map	-0.29	1.07	0.29	-0.90	0.33	-1.00	13	0.336
Applying	First Inquiry Map vs Last Inquiry Map	-1.07	0.92	0.25	-1.60	-0.54	-4.37	13	0.001*

Analyzing	First Inquiry Map vs Last Inquiry Map	-0.71	0.91	0.24	-1.24	-0.19	-2.92	13	0.012*
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* indicates a significant increase for this Inquiry Aspect, where $p < 0.05$

Appendix 3: Theorizing Inquiry Domain – Summary of Repeated Measures ANOVA Results

Tests of Within-Subjects Effects

MS	df	F	p
2.23	4	4.85	0.002

Pairwise Comparisons of Significant Results ($p < 0.05$)

Maps Compared	Mean Difference ^a	Std. Error
Inquiry Map 1 vs Inquiry Map 2	-.571	0.27
Inquiry Map 1 vs Inquiry Map 3	-.857*	0.23
Inquiry Map 1 vs Inquiry Map 4	-.857*	0.29
Inquiry Map 1 vs Inquiry Map 5	-1.000*	0.30

a. the values are negative because the scores of the later maps compared with are higher than in Inquiry Map 1

** indicates a significant increase for this Inquiry Domain, where $p < 0.05$*

Appendix 4: Reflecting Inquiry Domain – Summary of Repeated Measures ANOVA Results

Tests of Within-Subjects Effects

MS	df	F	p
1.29	4	2.73	0.039

Pairwise Comparisons of Significant Results ($p < 0.05$)

Maps Compared	Mean Difference ^a	Std. Error
Inquiry Map 1 vs Inquiry Map 2	-0.36	0.23
Inquiry Map 1 vs Inquiry Map 3	-0.36	0.33
Inquiry Map 1 vs Inquiry Map 4	-0.64	0.31
Inquiry Map 1 vs Inquiry Map 5	-0.79*	0.30

a. the values are negative because the scores of the later maps compared with are higher than in Inquiry Map 1

** indicates a significant increase for this Inquiry Domain, where $p < 0.05$*

Appendix 5: Applying Inquiry Domain – Summary of Repeated Measures ANOVA Results

Tests of Within-Subjects Effects

<i>MS</i>	<i>df</i>	<i>F</i>	<i>p</i>
2.24	4	4.96	0.002

Pairwise Comparisons of Significant Results ($p < 0.05$)

Maps Compared	Mean Difference ^a	Std. Error
Inquiry Map 1 vs Inquiry Map 2	-0.50*	0.23
Inquiry Map 1 vs Inquiry Map 3	-0.36	0.27
Inquiry Map 1 vs Inquiry Map 4	-0.71*	0.22
Inquiry Map 1 vs Inquiry Map 5	-1.07*	0.25

a. the values are negative because the scores of the later maps compared with are higher than in Inquiry Map 1

** indicates a significant increase for this Inquiry Domain, where $p < 0.05$*