ID 012: Understanding Adult Learners' Sense-Making to Inform Pedagogical Innovations in Blended Learning Environments

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Abstract

The purpose of this paper is to introduce a project recently commenced on adult learners' sense-making to inform pedagogical innovations in blended learning. Taking IAL's expanded definition of blended learning, blended learning can be any combination of classroom, tech-enabled learning and workplace or work-based learning. The project investigates Singapore adult learners' learning experiences in blended learning environments focusing on how they 'experience' and 'made sense of' their learning in and across blended environments and the implications of these processes for pedagogical practices and beliefs. For this project, we understand learning as a process contributing to an increased capability to act differently in the environment (Owen, 2017); the learning process involves sense- making. Weick (1995) describes sense-making as the process by which people give meaning to experience. Such processes contribute to knowledge building, construction and co-construction of knowledge. Besides, the structuring or architecture of different environments can facilitate reflection, and collaboration or can shut it down. Such an understanding of the spaces of learning not only potentially enables us to understand how learners sense make and embody practices, but also their interaction with the spaces in their journey of "transformation of understanding, identity and agency" (Edwards, et al., 2002, p.532).

Introduction

The purpose of this paper is to introduce a project recently commenced by Institute of Adult Learning (IAL), Singapore; "Understanding learner's sense-making to inform pedagogical innovation in blended learning". At the time of writing, the authors are in the process of selecting and approaching participant organisations and their learners. This paper presents our conceptual framework and our methodology; we look forward to engaging in discussion about the project.

This project investigates Singapore adult learners' learning experiences in blended learning environments focusing on how they 'experience' and 'make sense of' their learning in and across blended learning environments and the implications of these processes for pedagogical practices and beliefs. There have been no studies in Singapore and very few internationally that have investigated what the processes are for learners as they navigate their way through and across the different environments that constitute blended learning. Major outcomes from this project will include a deep understanding of what mediates learners' sense-making in different learning environments, providing rich sources of information for better design and facilitation of blended learning.

This project is important because new initiatives in SkillsFuture emphasise the importance of

promoting blended learning for Continuing Education and Training (CET) learners as a way to enhance their access to learning and to meet their dynamic learning needs. Blended learning can be any combination of the following four modes of learning (IAL, 2016):

- Classroom learning: face-to-face learning that takes place in a protected space and time
- Work-based learning: learning that is driven by an educational institution or Workforce Skills Qualification (WSQ) CET centres (e.g., internship) towards the attainment of a qualification
- Workplace learning: learning that is driven by an organisation (e.g., workplace supervisors) or individuals that is embedded in daily work practices
- Technology-enabled learning: learning that taps on the use of technology to support the learning process (p. 10).

As of December 2016, 75% of Workforce Skills full qualifications (WSQ) in Singapore were being delivered using blended learning; 96% of these courses use a combination of classroom and workplace learning, 2% of them use a combination of classroom and tech- enabled learning, and 2% of them use a combination of classroom, workplace and tech- enabled learning (iN.Learn 2020 update to Senior Management Meeting of SkillsFuture Singapore on 8th Mar, 2017), indicating limited take-up of technology-enabled learning. This shift in policy on promoting the use of blended learning requires different ways of thinking, designing, delivering and facilitating learning and leads us to pose questions about how learners make sense of learning in and across these different learning environments to apply what they learn.

Understanding the process of sense-making

There is a considerable body of literature that informs us how adults learn at and through classroom teaching or work (Billett, 2001; Bound, 2010; Bound & Lin, 2011; Nicolini, 2012; Fenwick, 2008; Boud & Molloy, 2013; Lantolf, 2009; Wells, 2000). For example, observation, asking questions, talking and problem solving with others, feedback, dialogue, inquiry, and being reflexive are commonly used learning strategies. In online learning environments we know that the opportunities the technology offers for collaborative sharing of documents, for building communities of practice, co-construction of knowledge and so on, offers potentially rich learning opportunities (Downing, 2015; Salmon, 2004). However, we know considerably less about how learners make sense of their learning in and across these different settings.

The features of sense-making involves learners noticing differences and find language to name the differences, connecting what they see and name to what they already know through talking with peers, supervisors and/or their own self-directed learning with tools and artefacts (Weick, Sutcliffe & Obstfeld., 2005). As reflected in Figure 1 below, this process often iteratively involves decision making, taking action, interacting with others, seeing what difference or impact their actions have. So the process is rather social, spiral and continuous (Weick et al., 2005).

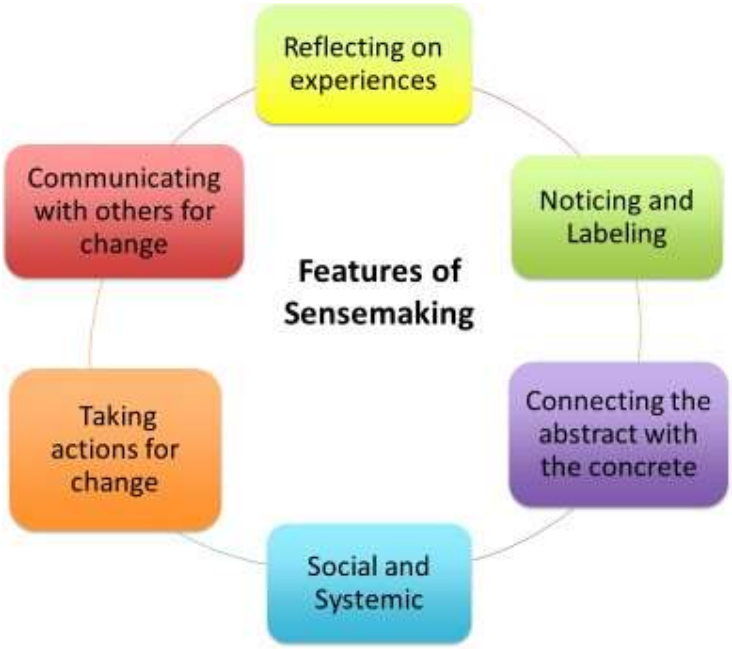

Figure 1: Features the process of sense-making (Adapted from Weick et al., 2005)

For this project, we understand learning as a process contributing to an increased capability to act differently in the environment (Owen, 2017); the learning process involves sense-making. Weick (1995) describes sense-making as the process by which people give meaning to experience. This usually occurs when individuals encounter something that is abstract - confusing, uncertain or new (Malitis & Christianson, 2014; Weick et al, 2005). The process is described as ongoing because there is no actual stop and start point. The absence of a beginning (or end) in sense-making means that individuals may not always consciously prepare to make sense of things – they just do so as events unfold within their experience (Weick et al., 2005).

In understanding the process of sense-making, the present study adopts a mix of different theoretical perspectives, e.g., cognitive, sociocultural and sociomateiral. The cognitive perspective (Kolb & Kolb, 2005; 2008) tends to centre on learners' cognitive capability in their sense-making, rather than a social process. Kolb & Kolb (2005; 2008) illustrate their idea of the sense-making process using four modes that occur within a cycle: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation (see Figure 2). Concrete Experience is the phase when individuals first receive information from the immediate environment, or recall previously received information (Eraut, 2004; Kolb & Kolb, 2005; 2008). This information will then be reflected upon in the Abstract Conceptualization mode (Kolb & Kolb, 2005; 2008). These concepts would then serve as the basis for helping individuals decide on which possible actions they would like to actively test out or not in their actual environment (Kolb & Kolb, 2005; 2008). This last mode is known as Active Experimentation.

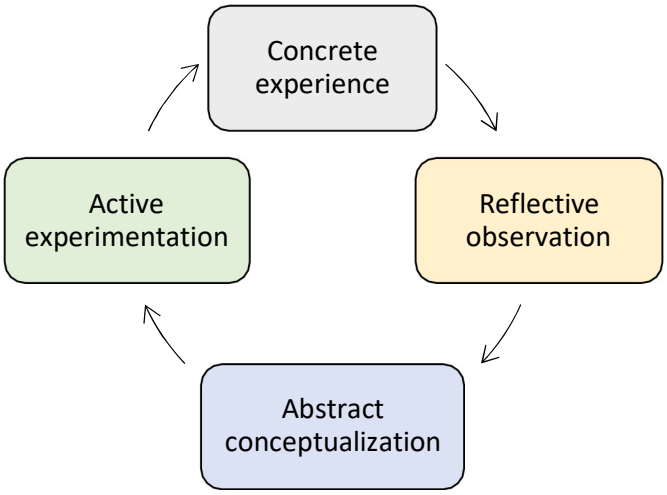

Figure 2: Kolb & Kolb's Experiential Learning Cycle

Adapted from The SAGE Handbook of Management Learning, Education and Development (p. 44), by Kolb, A. Y. & Kolb, D. A., 2008, London: SAGE Publishing Ltd. Copyright 2009 by SAGE Publishing Ltd.

Indeed, sense-making is not only an individual affair, but also a social one, whereby people in groups, teams, or within organizations learn by sharing and exchanging information with one another (Albolino, Cook & O'Connor, 2007; Jensen, 2009; Kolb & Kolb, 2005; 2008; Mueller, Yankelewitz & Maher, 2011). Moreover, since there is a participatory element present in the sense-making process, approaching the process of how learners make sense of their learning using only the cognitive perspective might seem too narrow. From a sociocultural perspective, learners do not only make sense of their environment by thinking about it on their own, but also by actively engaging others/tools/artefacts in the thought process via sharing and receiving the thoughts of oneself and others in order to build on the knowledge of one another (Fenwick 2015; Scardamalia & Bereiter, 2010; Wells, 2002). However, a sociocultural perspective tends to privilege learners over the tools/artefacts in their learning process, while the social dynamics, tools/artefacts and living organisms with which learners interact are a backdrop of their sense-making process. In contrast, sociomaterial perspective takes the tools/artefacts as fundamental elements to and inseparable from learning. In fact, materials can actively configure practice and knowing. From sociomaterial perspectives, researchers tend to view sense-making as a process in which learners weave together their practice, knowledge and environments with the daily material details that they attend to - not just to attune very closely to the connections, but also tinker and improvise, to interrupt, or to seize emerging activities (Fenwick, 2015).

If we consider sense-making as a process of "transforming collective cultural experiences (knowledge, skills and normative directions) into individual experience, constituting individual subjects in doing so, and at the same time changing social practices" (Salling Olesen, 2017, p. 5), this means we need to understand the dynamics involved in these processes. More specifically, we need to understand the processes of sense-making and how the context – the space, the inhabited practices, the individual biography – mediate sense- making for individual and collective subjects. For example, reflection is often considered an important capability for learning; dialogue and inquiry are essential components of reflection and are critical aspects for learning amongst peers, in classrooms, at work, online or

elsewhere. They are socially negotiated processes, requiring personal and collective/community sense-making; interpreting meanings and making them your own (Bound, 2010). This is a process of filtering through prior experience, knowing, and negotiation of meaning (Hung, Tan, & Chen, 2005, p, 38).

Besides the above pedagogical practices collectively experienced by learners, adult educators (AEs) and workplace supervisors, there are many other contextual factors that may mediate the sense-making process, to name a few, the design of the curriculum and use of technologies (Bhatti & Kaur, 2010; Koponen, Tedre & Vesisenaho, 2011; Scardamalia & Bereiter, 2010; Velada, Caetano, Michel, Lyons & Kavanagh, 2007); and affordances in work environments, e.g., organizational climate, peer and supervisor support, etc (Bhatti et al., 2014; Cheng, 2000; Ng, 2013). For example, research suggests that designing a training curriculum in blended learning environments is more than just creating contexts to enable opportunities for sense-making. Kirschner & Van Merrienboer (2013) illustrates that the objective of sense-making would more likely happen if the learning were designed such that it is holistic and scaffolded. Besides, research (e.g., Escobar-Rodriguez and Monge-Lozano, 2012) has shown that e-learning facilitates learners' sense-making outside of the physical classroom and also enables the learners to do sense-making in a more organised way. In work environments, organizational, peer and supervisor support was found to be significantly and positively associated with sense-making (Bound & Lin, 2011; Ng, 2013).

In the social and contextual processes of sense-making, learners' disposition, the inherent qualities of mind and character, may also influence their sense-making of their learning and work. For example, Hodkinson and Hodkinson (2004) found that enthusiastic, dynamic, forceful and confident disposition of the teacher empowered this teacher to approach learning and sense-making in an organized and systematic manner. While the cynical and unenthusiastic disposition of another teacher made this teacher highly critical and negative about the changes in course design, which resulted in his resistance for sense-making. In addition to learners' disposition, their identity may also influence their sense-making. According to Holland et al. (1998), identity is a central means by which individuals and their organised sets of behavoirs, are shaped and re-shaped over individual lifetimes with the social environment in the background. One of the features of learners' identity is positionality (Holland, Lachicotte Jr., Skinner & Cain, 1998), which is intimately related to rank, status and power. Social position provides learners with the privilege to material and social resources. Therefore, the identity of learners in workplace will influence their sense-making of work- related tasks due to the unequal distribution of information. In a study of the UK air traffic control system by Hughes et al. (1992), it was found that when information is distributed among personnel of different positions in the system, the cooperation of controllers, assistants and chiefs across the entire system as well as their active engagement with the materials used are critical in improving sense-making.of their tasks. Lastly, learners' agency – how they exercise autonomy in in thinking and acting – also plays a critical role in the sense-making process as learens take a proactive, critical, evaluative stance toward unwarranted exploitation, oppression, and even the trivialities (Haraway, 1998). For example, learners agency may mediate their engagment with learning activites and what is learned in the blended learning enviroments. They may elect to engage more effortfully in some components of vocaitonal activies, but participate less effortly or resentfully in others (Billet, 2002).

Drawing on the above discussion on the literature, these various factors mediating learners' sense-making processes constitute the conceptualization framework for the present study as shown in Figure 3 below.

Figure 3: Factors mediating learners' sense-making

To summarize, the process of sense-making plays an important role in enabling learners to actively practice what they have learnt. The process of sense-making may be mediated by many factors that seem to play a key role in affecting learners to practice what they have learnt. In other words, as long as changes to circumstances in blended learning environments take place, learners would need to make sense of the changes if they attempt to apply what they have learnt, with the mediation of these factors.

Research Questions

With the promotion and emphasis of blended learning stemming from new initiatives by SkillsFuture (iN.LEARN, 2016), researchers of the current study would like to have a deeper understanding of how individuals entering the workforce would engage in learning, given the various learning modes, and how they would made sense of what they have learnt in applying learning in their workplaces. Indeed, in Singapore's context, blended learning is no longer just about the integration of online learning experiences with traditional classroom learning (Garrison & Kanuka, 2004), but also the inclusion of authentic learning experiences (El- Muwafy, Kuhn & Snow, 2013), where learners get to practice and apply their knowledge and skills. Therefore, the factors that influence their sense-making found in research is worthy of further investigation.

In light of the above, the present study aims to investigate the following questions:

1. How do adult learners experience learning in and across different blended environments?
2. How do adult learners' make sense of their learning across different blended environments to their work?
3. What are the implications of the findings from RQ1 and RQ2 for pedagogical innovation in blended learning?

Research Methodology

Situated in the background as discussed in the above section, this study will draw on different qualitative approaches to study adult learners' learning experiences in blended learning environments; namely phenomenology and semi- ethnography. A phenomenological approach provides rich descriptive data capturing the experience of the phenomena of learners' learning. A semi-ethnographic approach provides an interpretive lens moving beyond the rich description and themes identified from the phenomenological data collection and analysis.

The unit of analysis will be learners' learning in and across blended learning environments. The researchers will approach six training providers delivering blended learning program(s) to identify six blended learning courses that meet the sampling criteria, across 3 industry sectors (Healthcare, ICT and Engeneering). Through these courses, 3-4 individual learners and their learning in and across the blended environments in each selected course will be the focus of data collection. Phenomenological approaches – open-ended interviews, observations, asking participants to take photographs etc., – will be used to capture data. To better understand how different spaces, tools and artefacts mediate the activity of learning and sense-making, a semi-ethnographic lens will be employed when conducting initial and follow up interviews with learners, and when interviewing AEs (trainers) and curriculum designers and capturing data about the how different spaces mediate sense-making. The latter approach will bring a practice lens (e.g. Nicolini, 2012; Schatzki, 2012) to the data collection and analysis. A practice lens provides a focus on the cultural, historical and distributed expertise in tools and practices, enabling researchers to 'see' the processes of mediation.

Six blended learning courses will be selected according to the following criteria to ensure that across the cases we include:

- A varied combination of blended delivery modes
- Three or more industry sectors (e.g. healthcare, ICT and aerospace)
- Programs across Certificate, Advanced Certificate, Diploma and above
- Programs of varied length (e.g. from less than 20 hours to 6 months or more)
- WSQ and non-WSQ

The industry selection criteria is based on the Programme for the international Assessment of Adult Competencies (PIACC) results on different adult learners' literacy and numeracy levels involved in these industries. PIAAC results show that adult learners' literacy levels in these three industries are different. Adults in ICT tend to show significantly higher literacy levels than Healthcare and Engineering.

Learners will be identified from within the selected programs based on the following criteria:

- Range in age (e.g. youth to workers 45 and older)
- Range in qualification levels
- Learners' motivations

PIACC data analysis shows that as compared to the older adult learners (above 45 years old), the young adult learners (16-34 years old) have higher proficiency levels in literacy (285 vs. 230), numeracy (285 vs. 226) and problem-solving (302.5 vs. 258), and higher percentages of tertiary qualifications (74% vs. 31%). Research (Cheng& Hampson, 2008; Yelon et al, 2013) showed that learners with clear learning goal tend to have a better sense-making of their learning.

Data collection and analysis

The research questions will be addressed drawing on data to be collected through phenomenological and semi-ethnographic observation, semi-structured interviews and relevant documents (for example, curriculum, facilitator and learning materials, provider policies and relevant national policies, learner artefacts from learners). Open-ended interviews will be conducted with the learners before they are observed. The purpose of the open-ended interviews is mainly to establish trust between researchers and learners, and also gather some basic background information of the learners (biography) before the observation. These interviews will be audio recorded. Learners (24), curriculum designers/trainers (around 12), and workplace supervisors (around 24) for these learners will also be interviewed multiple time throughout the course. In order to uncover as much information as possible about learners' sense-making in and across blended learning environments, researchers will move iteratively between curriculum designers, AEs (trainers), workplace supervisosrs and learners to the degree the setting allows. Each interview will take 60-90 minutes. All the interviews will be recorded and transcribed. Besides these pre-designed questions, the researchers may ask additional questions during the interview to elicit more information based on the interviewees' responses at the spot.

Table 1 summarizes the data collection and data analysis for each research question as raised in this project, followed by the elaboration on data collection and data analysis.

Table 1 Data collection and data analysis to address each research question

RQs	Data collection	Data analysis
RQ1	▪ Learners' experience through observation and interviews; ▪ Learners' biography through semi- structured interviews and a one page survey; ▪ Blended learning environments, e.g., physical setting in the environments, culture of support in the environments through observation, interviews and document (e.g. curriculum documents) discourse.	▪ Emergent thematic analysis of the data ▪ Quantify the patterns of the themes as identified ▪ Discourse analysis of documents
RQ2	▪ Field notes of observation and videos; ▪ Concept maps; ▪ Transcripts of dialogues and interactions; ▪ Multiple interviews (estimate two times) of leaners, curriculum designers/trainers, and workplace supervisors. ▪ Learner artefacts (e.g. submitted assessment documents)	▪ Coding the data against the IAM model, the model will be further developed during the coding, for example Kolb's elements and to capture learners' connections and developing conceptual understanding as evidenced in the concept maps, interviews and observations ▪ Quantify the patterns of learners' sense-making based on the coding.

RQ3	▪ Policy documents; ▪ Curriculum documents; ▪ Interviews of learners, curriculum designers/trainers, and workplace supervisors; ▪ Observations (for example of innovative practices)	▪ Emergent thematic analysis of the data; ▪ Discourse analysis of documents

Subsequently, the phenomenological and semi-ethnographic observation that includes interaction with the learner(s) means that researchers will be partially immersed personally in learners' learning processes in different learning environments. In the observation, researchers will make continuous field notes to capture observed interactions, sense-making and constructing knowledge across blended learning environments. Observations will be video-recorded and then transcribed and coded following the IAM model as shown in Table 2. The use of IAM model to analyse learners' interactions on their co-construction of knowledge may show learners' cognitive sense-making process following Kolb & Kolb's (2008) framework as shown in Figure 2.

The processes of sense-making contribute to knowledge building, construction and co- construction of knowledge. There are existing analytical tools to better understand the conceptualisation and knowledge building processes. Scardamalia and Bereiter's (2015) knowledge building approach is one such tool; it enables the researchers to categorise how learners construct and co-construct knowledge through interaction/dialogues with trainers or peers. In dialogue and inquiry, high quality questioning strategies are essential for promoting effective learning and knowledge building amongst learners (Bi, 2016). How do learners develop such questioning strategies, what enables this development? To unpack learner's sense-making in blended learning environments, the interaction analysis model (IAM) (Chai & Tan, 2009; Gunawardena, Lowe & Anderson, 1997) will be adopted to explore the different stages of knowledge construction and co-construction in learners' learning process.

Table 2. Interaction Analysis Model (IAM) for investigating 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.
	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 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	Proposal and negotiation of new statements/ideas embodying co-construction
3d	Proposal of possible solutions to identified problem
Phase 4: Checking and modifying proposed synthesis or co-construction	
4a	Checking against existing cognitive schema or literature
4b	Checking against personal experience
4c	Checking against perceived 'wisdom' in workplaces
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

In addition, we will investigate the development of learners' conceptual understanding by asking learners to make visible their development of understanding through the use of concept maps. These tools will provide a rich understanding of learners' knowledge construction and development of conceptual understanding and the interaction within the specific context in which such socially negotiated processes take place.

Summary

In this paper, we elaborate the development and conceptualization of the project. A summary for the conceptualization of the project is shown below for a better understanding for the readers:

1. The project will take a mixed theoretical perspectives to understand the process of sense-making, including cognitive, sociocultural and sociomaterial perspectives;

2. Drawing on this theoretical perspective, we conceptualize learners' sense-making process from a more holistic view, taking into consideration of learners' disposition, identity and agency as well as other contextual factors, e.g., pedagogical practices, technology used, curriculum design, organizational climate, peer and workplace supervisor support;

3. To gain the holistic view, this paper illustrate how to collect and analyze the data. Data will be collected by using different qualitative approaches, namely phenomenology and semi-ethnography, e.g., observations, open-ended and semi-structured interviews, taking field notes, conceptual maps, etc.

Based on this conceptualization, the present project aims to gain a deep understanding of the status quo of the implementation of blended learning in Singapore, e.g., its curriculum design, its benefits and constraints for learners' sense-making. Drawing on these expected findings, the present project aims to provide practical pedagogical practices and useful advices for training providers and policy makers to better facilitate learners' sense-making in blended learning environments.

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