Understanding Adult learners' sense-making to inform pedagogical innovations in blended learning: Two cases from Healthcare and ICT Industries

Bi Xiaofang & Mohamed Fadhil

1. Introduction

The purpose of this paper is to share some preliminary findings of a project conducted by Institute for Adult Learning (IAL), Singapore; "Understanding learner's sense-making to inform pedagogical innovation in blended learning".

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 curriculum design. There have been no studies in Singapore and very few internationally that have investigated what the processes mean and imply for learners as they navigate their way through and across the different learning environments that constitute blended learning. Major outcomes from this project include a deep understanding of what mediates learners' sense-making in different learning environments, providing rich sources of information to allow for better design and facilitation of blended learning. 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.

2. 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; Wells, 2000). 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. Therefore, the process is rather social, spiral and continuous (Weick et al., 2005).
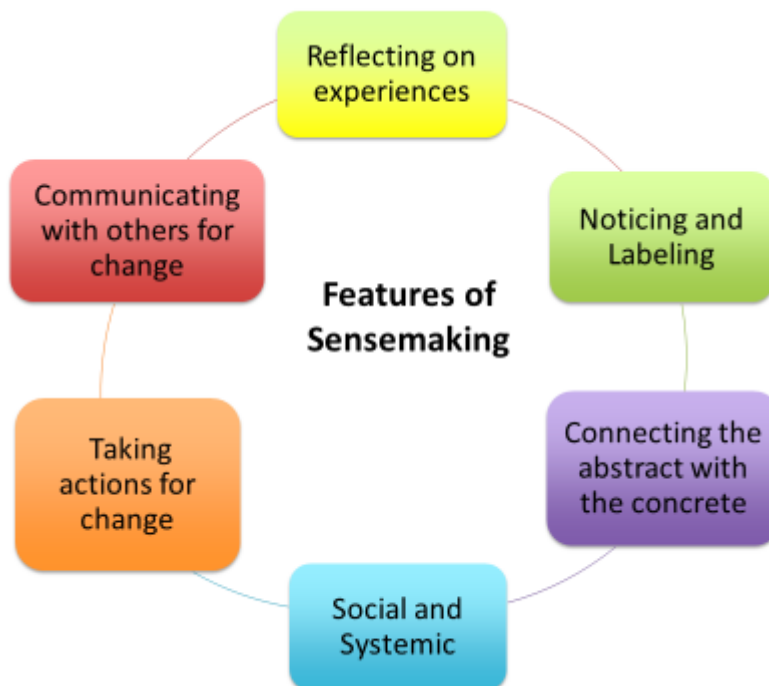
Reflecting on experiences

Communicating with others for change

Noticing and Labeling

Features of Sensemaking

Taking actions for change

Connecting the abstract with the concrete

Social and Systemic

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. 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. Besides, 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; 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). In the social and contextual processes of sense-making, learners' agency – how they exercise autonomy 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).

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 prompting 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.

3. 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 consideration of the factors discussed earlier, 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?

4. 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 experiences. 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 experiences 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 4 industry sectors (Healthcare, ICT, WSH and HR Management). The integral role these industries play in supporting the economic and social well-being for Singaporeans can be observed in many ways. For example, Singapore's maritime industry is a key part of the nation's economy, contributing 7 per cent to Singapore's Gross Domestic Product (GDP) and employing over 170,000 people. Maritime Singapore represents the entire eco-system of the maritime industry and is home to more than 5,000 maritime organisations and businesses. It is a vibrant industry that contributes 7% to our nation's Gross Domestic Product (GDP). Another important industry sector in Singapore is the healthcare industry. Singapore continues to face an ageing population, rising chronic disease prevalence, escalating healthcare costs and increasing complexity of care needs resulting in a rapidly changing healthcare landscape. These trends call for an increasing need for primary care sector, and strengthening of the nation's overall healthcare ecosystem. Each of these industries plays a key role in supporting Singaporean economic and social well-being but it is equally important to note that they also provide useful insights into a range of blended learning innovations.

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. A summary of the data collected is provided in Table 1 below.

Industries/ Courses		Learner s	Adult Educator s	Curriculum Designers	Workplace Supervisor s	Interview s	Participant Observation s
Health Care	1	4	4	1	0	17	8
	1	4	2	2	3	18	8
WSH	1	4	2	2	0	11	5
	1	4	1	1	N.A	5	2
ICT	1	3	1	1	N.A	10	4
HR Manag ement	1	4	3	3	N.A	7	3

Table 1 Summary of the data collection (Healthcare: classroom+work-based/worlplace learning; WSH: Classroom+work-based learning/workplace learning; ICT: classroom+e-learning; HR management: classroom+e-learning)

5. Preliminary Findings and Discussions

In this section, the preliminary findings from two cases in Healthcare (classroom + work-based learning) and ICT industries (classroom + e-learning) are presented to show how learners' agency, pedagogical practices, curriculum design and various support provided in the blended learning are working together to mediate adult learners' sense-making. Figure 2 presents the interrelations of the three mediators as found in the preliminary findings.
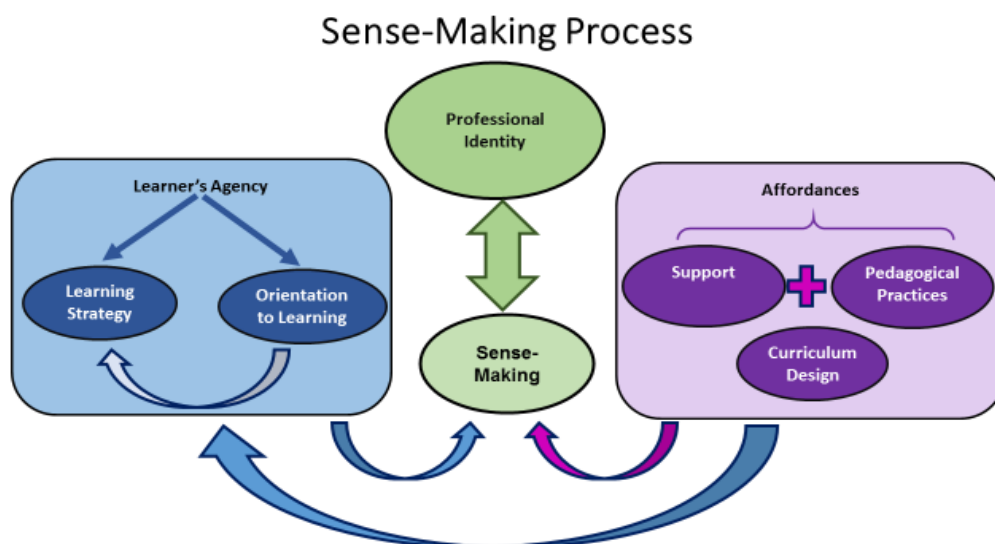

Figure 2. The interrelations among learner agency and affordances in blended learning for sense-making

5.1 Learners' Agency and Sense-Making

The preliminary findings showed that learner agency played a critical role in adult leaners' sense-making and translation of learning in and across blended environments. For the learners from both ICT and Healthcare courses, all of them shared that doing their own research on what they were learning and asking "Why" questions are crucial in their sense-making and translation of their learning across different learning environments. The agentic will of these learners was evident in their deep-seated desire to understand the reasons behind certain practices and procedures ventured independently to find out more about the underlying reasons underpinning these practices and procedures.

For example, one of the learners from Healthcare course (therapy assistant) learned the techniques of transferring patients from bed to wheelchair during classroom training. However, after reflecting upon his prior voluntary work experience with hospitals, he noticed that the techniques were not very similar. Before he entered workplace (a nursing home) for his attachment, he demonstrated agency by conducting research online to find out more about the different techniques in patient transfer in different clinical settings. From his research, he noticed that different settings may adopt different techniques for the purpose of transferring patients. In this case, he could apply and adapt the techniques he had learned from his classroom during his attachment at the nursing home. It is evident that his agentic will has afforded him an opportunity to better translate his learning from classroom to workplaces.

In addition, another learner from an ICT course (ERP SAP system for accounting) also shared that merely attending lectures and doing practices on e-learning platform were inadequate for her to understand the steps and gain mastery in using SAP system. Hence, in this instance, it becomes apparent how adult learners must have and keep a curious mind to constantly ask the "why" questions so that learning could be deep and meaningful (as demonstrated in the transcript below). The learner recalled a learning strategy from her past MBA learning experience where her lecturer encouraged the learner to think deeply by asking "why" questions. With this experience in mind, she took the agency to keep asking "why" questions to help her link the classroom learning with authentic workplace scenarios, thus allowing her to better facilitate her sense-making when using the SAP system.

> (talking about e-learning)... 'However, this is for you to practice. You want to go deep, you are just doing it for the sake of doing it. Not really understand the system. **Then for that you need to get people to explain to you**. Like why you are doing certain thing...Because **the why is more important. If let's say you don't learn by asking the why, you just do the how, then you won't learn anything'** (Learner from the ICT course).

In addition, a learner from the healthcare industry also explained that how she felt it necessary to ask questions and to reflect on her learning as means to facilitate her learning through a gradual process when asked why she was one of the few who was constantly asking questions to her peers and adult educator. Her agentic will is evident when she explained that due to an absence of clear instructions, she took the initiative to take charge of her learning by not only asking questions in class but also to do research on the internet to understand what she has learnt better. In addition, she also reflected on the mistakes she made during the practical session and attempted to correct them gradually as the course progressed.

(when asked why she kept asking questions in class)………. 'And some more, some of the notes like the transferring skills, **HMI** textbook, **they didn't give us very clear instructions**. So **I have to go for Google search**. From that, **I just remembered what the trainer teach me**. Then during the first learning session, that means practical session, we practised ourselves. We also grouped with each other.So from there, that **day I learn from there a bit, a bit, a bit.** So **I asked my course mates**. …….Then later the trainer, she will ask some of them to show us, the whole class, how to do it. So **I just picked out what I made a mistake so I just amend it, correct it**' (Learner from the healthcare course).

It is clear that this learner's exercised her strong agentic will clearly exhibited through her application of several learning strategies as well as her positive attitude she took towards learning. Her learner's agency was a key factor allowing her to effectively make sense of her learning across the different learning environments.

Similarly, another the agentic will of another learner from the healthcare industry could be observed through her resourcefulness in trying to make sense of her learning. She explained that to practise what she has learnt in the classroom and make sense of her learning, she would do a role-play at home where her children acted as her patients while she practised the techniques she learnt earlier in the day in the classroom. She found asking questions in class greatly facilitated the class participation and helped clarify doubts with regard to the lesson being taught.

(when asked how she practices the techniques she learns outside the classroom)'Yes it's useful, **because I already do... do somebody on it. I do on it. Even my children also**…….(Learner from the healthcare course).

To summarise, learner agency is crucial for adult learners' sense-making and translation of learning in and across blended environments. In addition, it is equally important to note that learners' agency could be triggered by learners' own personal and prior learning and working experience. In addition, the learner's attitude towards learning is also another determinant in effective sense-making. Therefore, to trigger this agency, adult educators are encouraged to take learners' prior learning and working experience into consideration when applying teaching and instructional strategies to trigger this agency in order for learners to make sense of their learning across different learning environments. It would also be important for adult educators to get learners become authors of their own learning by promoting effective learning strategies they could apply to help them make sense of their learning. Lastly, it would be beneficial to support the learning process by providing encouragement and motivation for the learners as this influences their attitude and orientation towards learning and would therefore, help trigger their innate agentic will.

5.2 Affordances in Blended learning & Sense-Making

The preliminary findings from the two courses also highlighted that pedagogical practices and curriculum design of these blended learning courses mediated adult learners' sense-making and translation of learning.

For example, the assessment method in the healthcare course proved to be a very effective pedagogical practice which facilitated the learners' sense-making. Instead of simply functioning as an "assessment of learning", the adult educator structured the assessment as

such that it became a form of learning for the learners to observe the gaps in their learning. Instead of merely assessing if learners were competent in completing the different procedures during physiotherapy sessions, the adult educator kept reminding the learners during the assessment that while each procedure is integral to the patient's recovery and that doing it well was important, the safety of the patients has to be prioritised above all other considerations. Therefore, before learners conducted any procedures during physiotherapy sessions, they must check and ascertain the safety of the patients. For example, they would have to ensure that the wheelchair is securely locked or the patient is in the correct position before being transferred.

> Anything that you do wrong, to them, they can just remind you. But anything that you do assessments, if it concerns with the safety of the patient ah, they will ask you to go and take the assessment again. **So, it's like the wheelchair, when we push the wheelchair right? If we never lock the wheelchair, then it's a safety concern. They will ask you to go… Do it again. So, they will remind you again and again and again that you need to lock. Once stationary, you need to lock. Once you see the patient, your bedside reel have to go up.** And when you lift the patient, make sure that your bedside is all the way down. So, every time, they will remind us the safety lah. So, it has been drilled into our head lah (Learner for healthcare course).

The learners shared that such reminders during the assessment helped them refresh and reinforce what they have learned, rather than the assessment merely functioning as a certification and grading instrument. When conducting the procedures during their workplace attachments, they realised that unwittingly, the safety of the patients has been deeply rooted in their minds which helped them better translate their learning from classroom to the workplace. This finding suggests that when conducting the assessment in blended learning, the adult educator ought to use it as another opportunity to reinforce the learning for learners to better facilitate their translation across different learning environments, rather than merely using assessments as a summative evaluation of their learning.

Besides the above pedagogical practices, curriculum design is another important consideration that could mediate learners' sense-making in blended learning environments. In the ICT course, to provide more flexibility and options for working adult in their learning, a majority of the content in the course was converted to e-learning content. Learners were left to explore this e-learning content independently and received little guidance and instruction. For each module which lasts one month, only two classroom learning sessions were conducted for each topic, including ones which learners found challenging and particularly difficult to navigate through. However, this design failed to promote and facilitate learners'' sense-making process. The learners shared that it became more difficult for them to make sense of the content, particularly for learners with little knowledge of the SAP system. They were not able to work out the e-learning modules by themselves, but instead pointed out that they needed more support and guidance from the adult educators. Secondly, for these working adults, they found that they did not have sufficient time to read and prepare before they came to the classrooms for the face to face modules due to their family and work commitments. This finding suggests that it would be ideal to reconfigure the percentages of each of the different components in the curriculum involving blended learning to better facilitate learners' sense-making and improve their learning experiences.

On the other hand, several learners from the healthcare industry mentioned that immediate hands-on practice immediately after learning a concept significantly facilitated their sense-making process. One learner explained that the immediate practical session that took

place after learning the theoretical concepts was crucial in integrating classroom learning with the practical sessions.

> (When asked about their practical sessions)……'it's almost every day you have an activity to do. So **you can like put whatever you've learn into like a real** life situation……..like since we've done it before, **so it's kind of like memory like muscles memory' (Learner for healthcare course).**

This was similarly reflected by another learner from the same industry who added that immediate hands-on practice allows for better memory retention and greatly assisted her in her sense-making process.

> (When asked about the practical sessions)……' 'Whatever **you learn you're going to be applying it more frequently**. And it's not over like three weeks later you're going to do it. **Like, you learn it, you do it. It's a lot more easier to absorb, and more relevance ' (Learner for healthcare course).**

To conclude, it is evident that affordances play a significant role in helping learners facilitate learners' sense-making process in blended learning environments. One effective pedagogical practice is to use assessment as a teaching tool and turn it into 'an assessment for learning' instead. During the assessment, the adult educator can not only note down the gaps in learning during the assessment but also provide learners with immediate reminders and feedback during the assessment itself which help them make sense of their learning. Another distinct teaching approach which stood out clearly was how appropriate hands-on practice sessions after a lesson greatly enabled retention for the learners and stimulate an effective sense-making process through reflection and practice. Therefore, it is recommended that adult educators and workplace supervisors consider the teaching approaches as discussed to facilitate learners' sense-making experience across different learning environments. Lastly, another important consideration for curriculum designers is the structuring of courses with e-learning components. It is crucial for curriculum designers to consider carefully the duration accorded to each part of the course. The findings clearly indicate that more face to face sessions are necessary to facilitate the e-learning components in the course and it was also found that the e-learning sessions would be most effective if situated between the face to face sessions to facilitate learners' sense-making experiences.

5.3 Learners' Agency & Affordances in Blended Learning

Section 5.1 and 5.2 discussed how learners' agency and affordances in blended learning mediated the learners' sense-making and translation of learning. In addition, the present study also found that there are significant connections between learners' agency and several of the affordances in blended learning such as the curriculum design of the blended learning and the support received from AEs or workplace supervisor in their sense-making.

For example, in the ICT course, the curriculum design tended to inhibit learners from exerting their agency to master the complex steps in using SAP system as shown in the following transcript of an adult educator. The adult educator from the ICT course shared that because of the design of e-learning was very rigid, it did not allow learners to take the agency to do the trial and error, thus limiting learners' sense-making of using the SAP system correctly and effectively.

This one, the course **doesn't encourage people to do trial and error**, because trial and error actually is erm, from my experience, **it is a learning process**. Because when **we don't do that one, we don't know… if I do this, what will happen? That one not encouraged in the course.** (AE for ICT course).

In contrast, learner agency could also be triggered by adult educators' support. One learner in the healthcare course demonstrated her agency by applying what she knew about breathing techniques and muscle movements she has picked up from doing yoga to help patients during her clinical attachment. The learner mentioned that she felt applying knowledge from prior learning would benefit and add value to her role as a therapy assistant (TA) and therefore, acted out the 'agentic will'. She highlighted that this inclination was triggered by the adult educator's suggestion for learners to utilise their background knowledge and previous work experience while at the workplace.

Lastly, another example where affordances played a key role in triggering learner's agency to facilitate the sense-making process was the support and guidance learners received from the adult educators and workplace supervisors. For example, one learner describe how her workplace mentor in a nursing home guided her in cases not covered in her course such as the special considerations and steps to take in the care of diabetes patients as well as the different methods in transferring patients safely. In addition, one learner pointed how her adult educator helped her prepare for her assessment with a mock test and giving her the appropriate feedback based on her performance.

> And **some more the adult educator give us a mock test** also. Mock test, yeah mock test. **After the mock test, I go home and think over it, what I went wrong. So what I've to add in**.'

Therefore, it is evident that the mock test and constructive feedback facilitated the learner's sense-making process. The feedback and support she received from the adult educator triggered her learner's agency to reflect on her performance during the mock test and to work on her performance for her actual assessment.

To conclude, different mediators are not only influencing learners' sense-making individually, they are also interacting with each one another other to effect adult learners' sense-making. This finding suggests that we ought to pay close attention to the interplay of different mediators on adult learners' sense-making as well as their individual influences. As shown in the above examples, the curriculum designers may need to design and structure the curriculum in a way to trigger more of learners' agency to exert their agency through trial and error processes. Similarly, the adult educators could also trigger learners' agency by intentionally encouraging the leaners to create links between their current and prior learning in order to facilitate their sense-making and allow for a more coherent translation of their learning experiences across the different learning environments. Lastly, the guidance and feedback from a workplace supervisor or adult educator can have far-reaching effects and benefit learner's sense-making experience and workplace performance.

6. Conclusion

In this paper, we presented the preliminary findings of two cases of the project. A summary for the preliminary findings of the project is shown below for a better understanding for the readers:

1. Learner agency is a critical mediator for adult learners' sense-making and translation of learning in blended leaning environments. It could be triggered by learners' prior

learning and working experience as well as the adult educator's support but it can also be inhibited by a poorly structured curriculum design in a blended learning course;

2. Various pedagogical practices and curriculum design could also mediate adult learners' sense-making and translation of learning in blended learning environments. For example, an assessment is not only a test, but could also be applied as a pedagogical instrument to reinforce learning and provide constructive feedback. In designing blended learning, e-learning may not be always the major or critical component. Depending on the difficulty of the curriculum content, the curriculum designer may need to consider the proportion of the different components in blended learning to better facilitate learners' sense-making.

3. Learner agency is also intimately connected to affordances and is another key factor in helping learners translate and make sense of their learning across blended learning environments. Although it has been discussed that a poorly structured curriculum can hamper the sense-making process, the findings clearly indicate that there were several instances where affordances can trigger learners' agentic will and as a result, stimulate the sense-making process. One example is the giving of appropriate feedback and support from a workplace supervisor or adult educator can trigger a learner's own agentic will and help the learner reflect and make sense of his or her own learning.

Based on these findings, the present study presents a deep understanding of the status quo of the implementation of blended learning in Singapore such its curriculum design and its benefits and constraints for learners' sense-making. Drawing on these findings, the present study provides some practical pedagogical practices and practical suggestions for training providers and policy makers to better facilitate learners' sense-making in blended learning environments.

References

Albolino, S., Cook, R., & O'Connor, M. (2007). Sensemaking, safety, and cooperative work in the intensive care unit. *Cognition, Technology and Work*, *9*, 131-137.

Bhatti, M. A. & Kaur, S. (2010). The role of individual and training design factors on training transfer. *Journal of European Industrial Training*, *34*(7), 656-672. DOI: 10.1108/03090591011070770

Bhatti, M.A., Ali, S., Isa, M. F. M., & Battour, M. M. (2014). Training transfer and transfer motivation: the influence of individual, environmental, situational, training design and affective reaction factors. *Performance Improvement Quarterly*, *27*(1), 51-82. DOI: 10.1002/plq.21165.

Billett, S. (2001). *Learning in the workplace*: *strategies for effective practice*. Crows Nest: Allen & Unwin.

Bound, H. (2010). Developing quality online dialogue: dialogical inquiry. *International Journal of Teaching and Learning in Higher Education. 22*(2), 107-119.

Bound, H., & Lin, M. (2011). *Singapore Workforce Skills Qualification (WSQ), workplace learning and assessment (Stage I and II)*. Singapore: IAL.

Cheng, E. W. L. & Hampson, I. (2008). Transfer of training: a review and new insights. International Journal of Management Reviews, 10(4), 327-341.

Fenwick, T. (2008). Women's learning in contract work: practicing contradictions in boundaryless conditions. *Vocations and Learning*, *1*(1), 11–2.

Fenwick, T. (2015). Sociomateriality and learning: a critical approach. In D. Scott & E. Hargreaves (Eds.), The SAGE Handbook of Learning, (pp. 83-93). London: SAGE.

Institute for Adult Learning. (2016). *Blending classroom with work and technology: how to design a blended curriculum.* IAL.

Jensen, E. (2009). Sensemaking in military planning: a methodological study of command teams. *Cognition, Technology & Work*, *11*, 103–118.

Koponen, T., Tedre, M., & Vesisenaho, M. (2011). An analysis of the state and prospects of e-learning in developing countries. *International Journal of Education and Development using Information and Communication Technology, 9(2), 19-36.*

Kolb, A. Y. & Kolb, D. A. (2005). Learning styles and learning spaces: enhancing sxperiential learning in higher education. *Academy of Management Learning & Education*, *4*(2), 193–212.

Kolb, A. Y. & D. A. (2008). Experiential learning theory: a dynamic, holistic approach to management learning, education and development. In Armstrong, S.J. & Fukami, C. V. (Eds.), *The SAGE Handbook of Management Learning, Education and Development* (pp. 42-68). London: SAGE Publications Ltd.

Malitis, S. & Christianson, M. (2014). Sensemaking in organizations: taking stock and moving forward. *The Academy of Management Annals*, *6*(1), 57-125.

Mueller, M., Yankelewitz, D., & Maher, C. (2011). Sense making as motivation in doing mathematics: results from two studies. *The Mathematics Educator*, *20*(2), 33-43.

Ng, K. H. (2013). The influence of supervisory and peer support on the transfer of training. *Studies in Business and Economics*. Retrieved from: http://eccsf.ulbsibiu.ro/RePEc/blg/journl/838kueh.pdf

Nicolini, D. (2012). *Practice theory, work and organization: an introduction.* Oxford University Press, Oxford.

Owen, C. (2017). *Enhancing learning in the workplace.* Paper presented at IAL Expert Roundtable (20th to 24th Mar, 2017), Singapore.

Salling Olesen, H. (2017). *Experience, identity and competence – concepts for lifelong learning policy.* Paper presented at IAL Expert Roundtable (20th to 24th Mar, 2017), Singapore.

Scardamalia, M., & Bereiter, C. (2015). Knowledge building: theory, pedagogy, and technology. In Sawyer, R. K. (Ed.). *The Cambridge handbook of the learning sciences* (2nd Ed., pp. 397-417-118). NY: Cambridge University Press.

Schatzki, T. R. (2012). A primer on practices. In J. Higgs, R. Barnett, S. Billett, M. Hutchings & F. Trede (Eds.), *Practice-based education: perspective sand strategies* (pp. 13-26). Rotterdam: Sense.

Velada, R., Caetano, A., Michel, J. W., Lyons, B. D., & Kavanagh, M. J. (2007). The effects of training design, individual characteristics and work environment on transfer of training. *International Journal of Training and Development*, *11*(4), 282-294.

Weick, K. (1995). *Sense-making in organizations.* Thousand Oaks, CA: Sage.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, *16*(4), 409-421.

Wells, G. (2000). Dialogic inquiry in education: building on the legacy of Vygotsky. In C. D. Lee & P. Smagorinsky (Eds.), *Vygotskian perspectives on literacy research* (pp. 51-85). New York, NY: Cambridge University Press.

Wells, G. (2002). Learning and teaching for understanding: the key role of collaborative knowledge building. *Social Constructivist Teaching*, *9*, 1-41.