A CLASSROOM ACTION RESEARCH ON

HOW MOBILE LEARNING ENABLES THE CO-CREATION OF NEW KNOWLEDGE IN REGULATED COLLABORATIVE LEARNING

A CLASSROOM ACTION RESEARCH ON HOW MOBILE LEARNING ENABLES THE CO-CREATION OF NEW KNOWLEDGE IN REGULATED COLLABORATIVE LEARNING

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ABBREVIATION

K	Knowledge
MIM	Mobile instant messaging
mCSCL	Mobile Computer Supported Collaborative Learning
ML	Mobile learning
SRL	Self-regulated learning
CRL	Co-regulated learning
SSRL	Socially shared regulated learning
UTCC	University of the Thai Chamber of Commerce

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ABSTRACT

Mobiles as a learning tool enriches mobile computer supported collaborative learning (mCSCL). Engaging in metacognitive interaction enables students to exercise greater regulatory learning and this can influence learning outcomes. However, despite insightful empirical studies, there is no research into the actual processes of new knowledge formation. This leads to the question of how mobile learning (ML) experiences co-create new knowledge. A pilot study and two classroom action research were carried out in this qualitative research. Analyzing the mobile messages using conversation analysis, the study shows that self-regulated learning (SRL) in mCSCL is non-linear as indicated by existing theory. The findings show that learners find ways to SRL activities in socially stimulated learning environment. Through knowledge sharing, students seek new insights into the learning instead of mere transfer of existing content. The Strategic Co-creation of New Knowledge in mCSCL Model has been developed providing innovative ways to approach ML. The findings comprise of improved descriptive models in cross-boundary learning. The research is significant as emerging elements encourage instructors to rethink and design better ML activities to optimize learning. Three recommendations are made and if

implemented will enable learning facilitators achieve enhanced learning outcomes, engage learners better and improve learning experiences.

Keywords: Mobile Learning, Mobile Computer Supported Collaborative Learning (mCSCL), Self-Regulated Learning, Social Learning, Co-creation of New Knowledge

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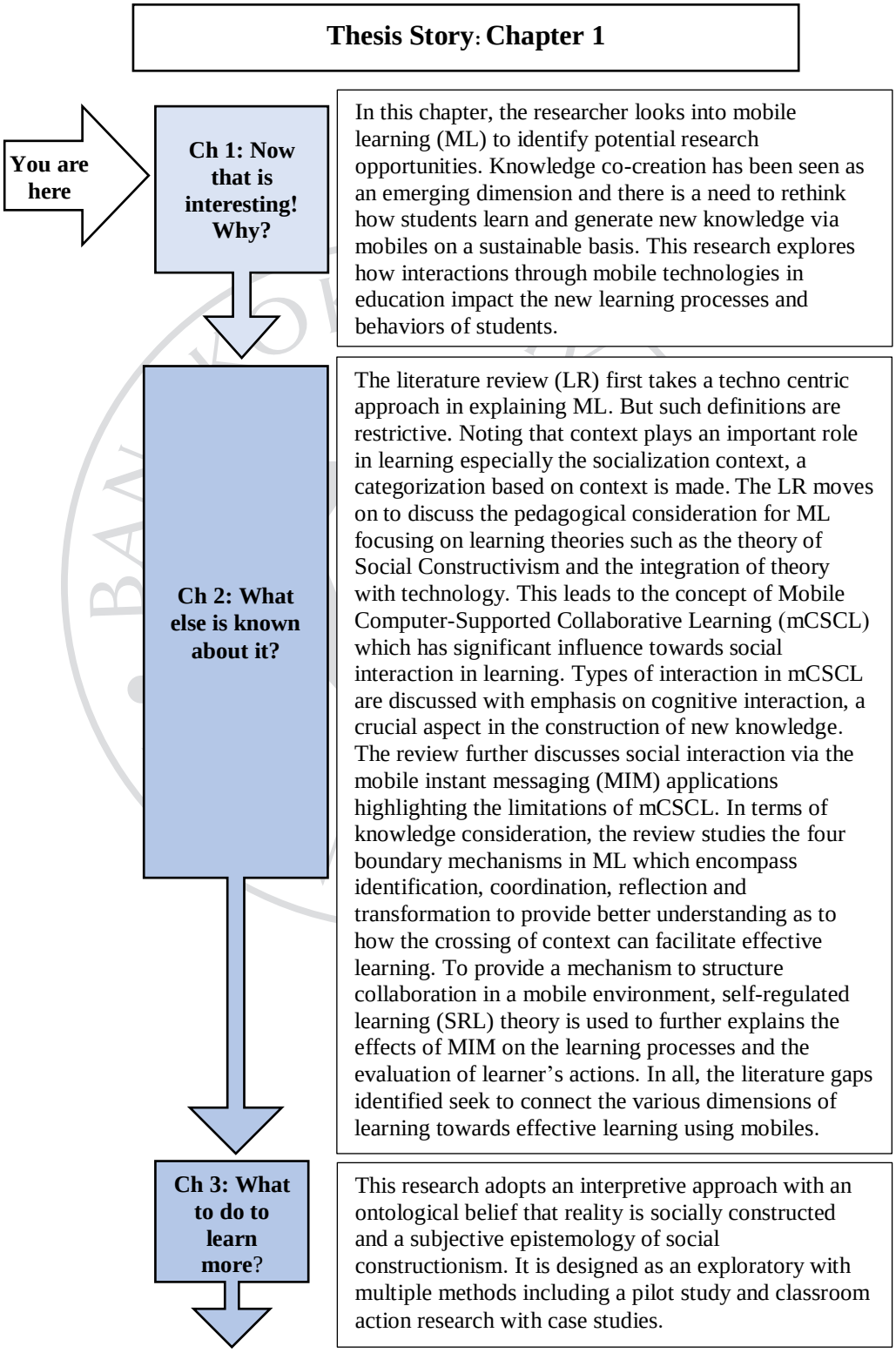
CHAPTER 1

INTRODUCTION



Chapter 1 investigates the foundation from which the research is developed. It explores WHY the researcher believes it is imperative to develop greater understanding of the mobile learning (ML) concept and how social interaction via the mobile educational technologies impact students' new learning processes and behaviors today. Specifically, the research explores the why and how elements of ML have on new knowledge construction and the self-regulated learning (SRL) behaviors towards effective learning. Knowing this is valuable not only to students, but also to people they communicate with in the wider boundary of ML and beyond. This chapter seeks to define the basic premises of the research and states the research objectives and questions. It also explains the research approaches and details potential limitations of the research. These will provide a robust and relevant framework to guide the LR in Chapter Two.

1. Introduction

In a progressively digital world, communication tools like smartphones offer high potential and influence practices in teaching and learning (Prensky, 2005; Schuck & Aubusson, 2010; Traxler, 2007). Students use them increasingly in everyday life. Accessing information through mobile handheld devices has become everyday experiences in personal, social and working lives (Figueiredo, Godejord, & Rodrigues, 2016, p. 77). Mobile technologies have made possible the 'here' and 'now' learning enabling learners to obtain information anytime and anywhere to perform authentic activities in the context of their learning (Martin & Ertzberger, 2013). This change signifies the transformation of ML from "Electronic" to technology-supported learning approaches (Becking et al., 2004; Shih, Chuang, &

Hwang, 2010). The presence of multimedia technologies into the classroom changes the learning landscape and influence the way learners connect and share information with each other (Muller, Lee, & Sharma, 2008). Inevitably, these new mobile applications and devices modify the way people learn (Pea, 1993) bringing new practices and attitudes that engage students in individual and collaborative learning activities (Alexander, 2006; Barnes, Marateo, & Ferris, 2007; Hartman, Dziuban, & Brophy-Ellison, 2007; Kelly, 2008; Thompson, 2007). Exploring students' perception of ML and how they regulate their learning in the ML processes will give new lights to the sustainability of ML into the 21st century.

1.1 Why sustainability in the mobile learning

ML is not a novel concept in education. In the last 10 years, innovative education with the use and adoption of mobiles have been growing fast in many educational institutions globally. However, with advancement and changes in ICT technologies, ML remains at its infancy stage with limited research providing lasting outcomes (Liaw, Hatala, & Huang, 2010; Muyinda, 2007). There are few guidelines and examples of best practices available to ensure the sustainability of ML as a result. Not able to live up to its promises, many ML programs are not adopted or becoming sustainable (Wingkvist, 2009). Furthermore, without much empirical evidence to support the extensive application of mobile and ubiquitous learning in higher education, there is no consolidated view as to how to sustain the practices (Pimmer, Mateescu, & Gröhbiel, 2016). As such, the impact and capabilities of ML have not been fully studied. Although the complexity of sustainable ML increases with the fast pace of change in digital technologies, the researcher sees this research gap as opportunity to go beyond the technology domain and examines how learners view and

use mobiles for learning as a contribution to the study of sustainability in ML. Scott (2002) perceived sustainability as a problematic term because it had been used very widely. Generally, sustainability refers to "maintaining well-being over a long, perhaps even an indefinite period" (Kuhlman & Farrington, 2010, p. 3441). It has been acknowledged as one of the most important issues in affirming growth and development. In the context of ML, Setirek and Tanrikulu (2015) defined sustainability as the ability to address present needs in education and objectives of ML; users' ability to adopt the new technology and users' adaptability to possible changes to make progress. Kukulska-Hulme and Traxler (2005) suggested that, a sustainable ML program should survive on its own values and adapt to changes in the learning environment. Under this condition, sustainable ML relates to the ability to maintain innovation over time and to become embedded into mainstream practice.

There are multiple perspectives and 'differing prognoses' (Scott, 2002, p. 4) towards the issue of sustainability with the integration of technology in education. In their research on trends and issues concerning technology in learning, Aktaruzzaman, Shamim and Clement (2011) indicated that sustainability was a neglected issue overshadowed by effectiveness, cost and equity. Sustainability depends not only on the adoption but also educational needs and challenges in ML (Setirek & Tanrikulu, 2015). Cisler (2002) highlighted 4 sustainable components namely economic, social, political, and technological sustainability in educational. He refers economic sustainability to the ability of the educational institution to fund ML over the long term. For social sustainability to prevail, he suggests that ML projects should include the wider community such as parents, political leaders and business partners and the involvement of these stakeholders to the duration or growth of the innovation. Issues

of policy and leadership have to be discussed for political sustainability. According to Cisler (2002), choosing effective technology for use in the long term would see to the technological sustainability of ML. Ng and Nicholas (2013, p. 698) added pedagogical sustainability as the fifth component. As illustrated in Figure 1.1. pedagogical sustainability is linked to teaching and learning practices that support long-term objectives of the ML programs.

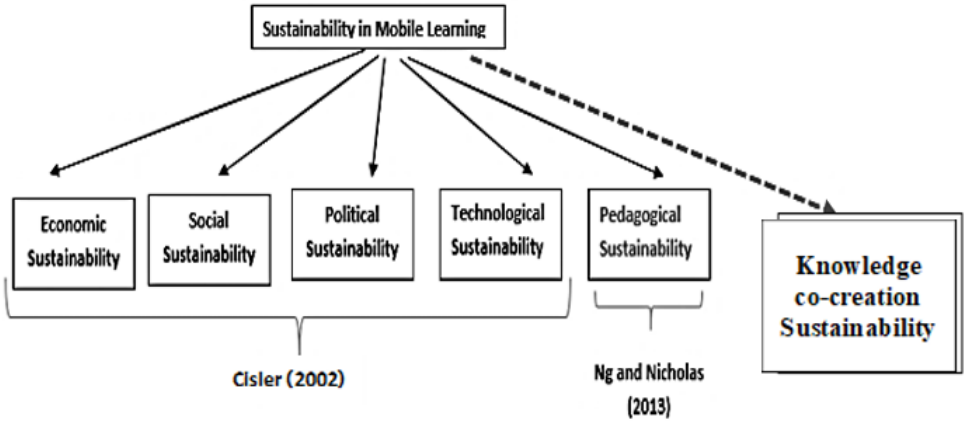


Figure 1.1: Sustainability dimensions of Mobile Learning
Source: Adapted from Cisler (2002); Ng and Nicholas (2013)

These researchers highlighted that pedagogical sustainability looked into how the interpersonal relationships between teachers and learners' facilitated learning with mobile devices. In other words, to understand pedagogical sustainability, there is a need to examine how interactions between stakeholders and mobile devices users influence the sustainability of a ML in tertiary institutions. The important aspect in this dimension is that it includes informal learning and how this out-of-class context is connected with the formal aspects of learning using mobile devices. Although the pedagogical component can support learning practices in ML, Ng and Nicholas (2013) recommended that sustainable ML in schools needed to focus on the basic

issues that were human-related. In line with this proposition, Trencher, Yarime, McCormick, Doll, and Kraines (2013) highlighted the emerging element of co-creation for sustainability in universities. The sixth dimension sees the shift in focus towards knowledge production and transdisciplinary research. This research joins the bandwagon to examine the future of ML by exploring this new sustainable dimension that takes knowledge construction and new knowledge co-creation into consideration to reflect effective learning in the ML environment. Figure 1.1 incorporates the 6 dimensions of sustainability in ML in chronological order.

Trencher et al. (2013, p. 152) defined the term co-creation as a mean towards societal transformation through the collaboration among various social actors with the "goal of materializing sustainable development in a specific location, region or societal sub-sector". Trencher et al. (2013) research was conducted on the macro level focusing on an integration and synergizing of various research and social engagement paradigms. For this study, the researcher intends to examine sustainability at the micro level, focusing attention back on the students' perspective in the knowledge construction process in ML. Taking a knowledge management standpoint, this research further explores new knowledge co-creation in a ML environment.

1.2 Why new knowledge co-creation

This research adopts a practice-based view of knowledge. Knowledge construction is not a phenomenon that takes place solely in a person's head but rather is enhanced as a participative social process (Hermanrud, 2012). Unlike the possession perspective, whereby individuals can transfer their knowledge to create common understanding of things as suggests by Nonaka and Konno (1998), the practice perspective indicates that knowing comes with action and knowledge is not

easily be transferred. However, according to many researchers, mediators can help to facilitate the translation and recreation of knowledge in practices in different settings (Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003; Brown & Duguid, 1991; Lave & Wenger, 1991; Marabelli & Newell, 2012).

Knowledge construction is one of the processes that highlights cognitive activities. This can come in the form of students' behaviors such as seeking information, interpreting information acquired, analyzing and summarizing information, critiquing and rationalizing through various choices and arguments and making decisions in online discussions (Zhu, 2006). Although past research indicates that students have the tendency to share and make comparison of available information to them and not progressing to construct new knowledge while collaborating (Ada, 2009; Schellens, Van Keer, De Wever, & Valcke, 2008), constructing knowledge remains important for university students to learn, especially for online learning. If students engage in effective collaboration using strategies such as questioning, clarifying or giving support (Mansor & Abd Rahim, 2009), they will experience meaningful learning. At a higher-level of knowledge construction, students become involved in more intellectual arguments, seek justification, or make decisions and these characteristics are essential in developing students to become critical thinkers which further help them to construct new knowledge (McLoughlin & Luca, 2000).

In general, students enter the classroom with their diverse existing knowledge, skills, beliefs, and attitudes, which guide them to interpret and organize any in-coming information. It is widely acknowledged that prior knowledge influences learning, and that learners develop ideas based on their prior knowledge

(Glasersfeld, 1984; Resnick, 1983). In other words, how students process and integrate new information influence how they remember things, how they think and apply the new information to create knowledge. In this research, knowledge is acquired through practice. It is embedded, embodied and invested in practice. Knowing is a social and organizational activity and knowledge can be socially constructed through interactions. Thus, communication is seen as a crucial process in the production and mediation of knowledge. Presently, many learning institutions are looking for innovative ways to enhance student learning experiences. With the integration of technology to learning, ML offers novel ways to represent knowledge, new educational practices, and new global communities of learners. In the ML context, community of practice (CoP) can be seen as a 'learning partners' whereby students find them useful to learn from especially from a particular domain different from them. This is because CoP participants use each other's "practical experiences as the learning resource" (Wenger, Trayner, & De Laat, 2011, p. 9). Consalvo, Schallert, and Elias (2015, p. 3) defined practice as "a way of acting in the world" and as "a field of endeavor and expertise". By interacting with each other, sharing the right information and experiences, providing insights and advices to help each other problem solving, enable participants in CoP to co-create knowledge. In other words, value is created as a result of CoP members' activities and in their interactions with others in informal networks (Smith, Hayes, & Shea, 2017). According to Wenger et al. (2011), CoP's could generate 5 different cycles of value creation namely immediate value, potential value, applied value, realized value and reframed value. Wenger et al. (2011) referred immediate value to learning that could be used immediately to solving a problem and potential value were benefits related to the

shared skills and knowledge that could be realized in the future. While applied value referred to the application of shared skills and knowledge to new contexts, realized value incorporated CoP participants and stakeholder reflections on how the skills and knowledge gained from their participation could help them achieve important goals. Lastly, reframed value involved the identification and definition of new criteria for success.

Neier and Zayer (2015) also noted that social media networks could potentially be effective for students to engage, discover and share ideas and thus forming co-creation platforms (Grönroos & Gummerus, 2014). Conejar and Kim (2014) cited that mobile technologies helped students to explore the world around them and facilitated them to develop solutions for complex problems when they collaborate with peers and teachers. Mobile collaboration using communication applications allows students to collaboratively work together in different place and time. In this digital communication platform, students can negotiate opinions with group members leading to knowledge construction (Beers, Boshuizen, Kirschner, & Gijselaers, 2005; Meijden, 2005; Schellens et al., 2008). The co-creation experience itself may provide value and, in the education contexts, value may continue to emerge over time. However, as mentioned by Dean, Griffin, and Kulczynski (2016), this was an under-researched field. To date, there is also little understanding on the nature of perceived value at the tertiary educational level. Research is still needed to further explore the role and impacts of technologies upon students' perceived value. Understanding how this value is created and the mechanisms involved will enhance perceived value for greater student engagement in learning.

The concept of co-creation originates from the field of business. Co-creation of value is seen as the process in which products, services and experiences are developed together by the company and its customers or stakeholders that creates new world of value (Ramaswamy, 2009). The users of services are both the "co-creators and the judges of service value" (Ramaswamy, 2009, p. 112). In other words, when people meet and exchange experiences and expertise, some forms of benefits will be received and this benefit creates shared value (Sennett, 2012). It has been proven to be effective when applying this marketing theory in business and researchers such as Hemsley-Brown and Oplatka (2006) has suggested that the co-creation concept could be applied to the higher education sector. Co-creation behavior comprises of citizenship behavior and participation behavior (Yi & Gong, 2013). While citizenship behavior relates to behaviors such as helpfulness, tolerance, advocacy, and seeking feedback (Yi & Gong, 2013), participation behaviors include four broad behaviors, namely seeking of information, the sharing of information, having responsible behaviors, and engaging in personal interaction (Yi & Gong, 2013). In information seeking, students tend to look for information for clarification purposes. They are aware of their expected roles and this lead them to learning and performing their tasks (Yi & Gong, 2013). The process in which students seek and comprehend information has changed drastically over the last decade (Hennig-Thurau et al., 2010). As they become active information seekers, they no long depend on the learning material in class. Instead, students look for alternative sources of information that they can acquire either from peers or informally based information (Fagerstrøm & Ghinea, 2013). As more formal or informal interaction takes place over the internet environments, information searching become more complex, two-way interaction and

human guidance are also commonly involved (Mills, Knezek, & Khaddage, 2014). Hence, the traditional assumption that learning takes place as knowledge acquisition within people minds has now been challenged by numerous empirical researches especially in the fields of collaborative learning and knowledge creation.

Students learning satisfaction and performance relate to their university experiences in participation and engaging in citizenship behavior. In determining co-creation value, experiences of learners can be seen as critical component (Prahalad & Ramaswamy, 2004). It is therefore important to examine the co-creation of value to know the real effect it has on students' ML behaviors and learning processes. The co-creation experience itself may provide value, and value may continue to emerge as learners reflect and engage in further value-generating processes (Dean et al., 2016).

The new knowledge creation phenomenon in the current ML environment also signifies the need to narrow the gap to better understand how student learn and the new learning behavior and expectations of students. Unlike earlier technologies and applications (Alvestrand, 2002), the current communication applications such as the MIM has opened doors to new potential to create an interactive and collaborative learning environment. The extensive studies in diverse contexts demonstrate that knowledge creation is embedded in social interaction and dialogue (Tsoukas, 2009). This conception emphasizes learning and knowledge creation occur through participation in communities and transforming knowledge among participants (Sfard, 1998). The individualistically oriented conceptualizations of learning has been challenged. The group itself has become the unit of analysis signifying the shift towards a more emergent, socially constructed, properties of the interaction (Dillenbourg, Baker, Blaye, & O'Malley, 1996).

The extensive use of new technologies offered by Web 2.0 harnesses participation, social networking and collective intelligence. This in terms, strengthens the mobile computer-supported collaborative learning (mCSCL) to enhance and extend individual-oriented learning systems (Ludvigsen & Mørch, 2010). Hence, the emerging influence of 'communication media' over the 'information media' in the ML context transforms the human computer interaction to social interaction or 'dialogues' (Enyedy & Hoadley, 2006, p. ix). Yet, there have being no consensus and little research carried out on the actual, micro level realization of the knowledge creation process in ML (Horan & Finch, 2011, p. 4; Tsoukas, 2009). Interestingly, despite being a critical component and activity in today's learning, ML is still encountering many challenges (Macharia & Pelser, 2014). Little research has attempted to clarify the role of interaction in learning from a theoretical viewpoint (Wang, Chen, & Anderson, 2014). Neier and Zayer (2015).added that there is insufficient understanding in how students use these mobile technologies and social applications to co-create value. With a greater engagement of the mobile community, it justifies a refocusing and examination of the way students learn with their mobiles in a student-centered learning paradigm as depicted in Figure 1.2.

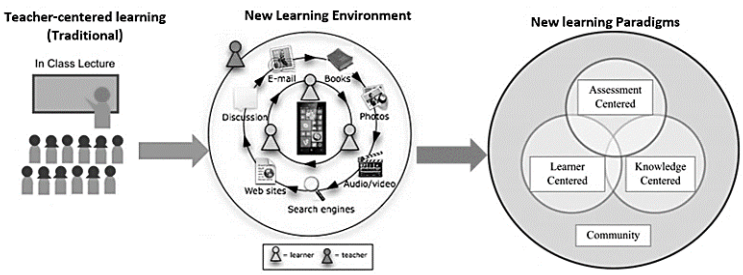


Figure 1.2: The new learning paradigms

Source: Adapted from Bransford, Brown, and Cocking (2000)

1.3 Why students' experience counts

With the availability of mobile devices such as smartphones, teachers are able to create interactive learning experiences and engaging students in and outside of the classroom. Both Jones, et al. (2006) and Motiwalla (2007) suggested that the rich and varied communication could motivate students to take active roles and participate in the learning processes. As such, they are no longer seen as passive receivers of knowledge (Looi et al., 2010). This new learning behavior is useful to collaborative knowledge construction. When students share knowledge and experiences, they can develop expertise related to their field or their interests (Lave & Wenger, 1991) as well. In this research, ML experiences are seen as forms of personal or social sense making. Each student holds a networked mobile device that connect them to a dynamic system which they are learning about. Students can experiment and learn from the environment on their own by interpreting what they face or see and respond either alone or with other people's participations. Through their interaction, students are able to renew their understanding of the authentic contexts and associate themselves with the learning in their formal lessons.

Hence, ML is more than an extension of traditional education, it facilitates alternative learning processes and instructional methods that the theories of new learning identify as effective for learning (Valk, Rashid, & Elder, 2010) and having the potential of reaching educational goals (Şad & Göktaş, 2014). Learning processes can be defined as the ways in which students perform their academic tasks that can influence the learning outcomes (Biggs, 1994, p. 318). An approach to learning embeds the intention of the students when starting a task and the corresponding strategies used to complete the tasks.

There are many approaches to learning and the learning outcomes are closely linked to the selected approach. ‘Surface’ and ‘deep’ are two commonly known approaches to learning (Biggs 1994). Students following a ‘surface approach’ tend to be less interested in the understanding of the subject. Students resolve to rote learning and memorization techniques as a mean to pass exams. Subsequently, they are motivated by acquiring the grade or the qualification. In contrast, students adopting deep learning or deep-level processing, seek the underlying meaning of the information. Biggs sees deep learning as a way in which students systematically analyze new facts and ideas, and applying the new learning into their existing cognitive structures to create linkage between ideas. Entwistle (2000) further stated that deep learning comprised of process in which students developed new meanings based on their individual experiences and course materials. As they engage in idea discussions with others, they demonstrate higher level of commitment towards the learning and this also reflect on how each pieces of information is associated with larger constructs or patterns, and the application of knowledge in the practical world (Biggs, 1994).

Considering the significant influence of deep learning and the importance of cognitive engagement by the learners, studying the new knowledge co-creation process is crucial to elevate students’ learning to higher order of thinking skills (HOTS) according to the revised Bloom’s taxonomy (Anderson et al., 2001). The modified taxonomy as depicted in Figure 1.3, moves from remembering to understanding, applying, analyzing, evaluating, and creating signifying greater emphasis on the higher cognitive processes (Anderson et al., 2001).

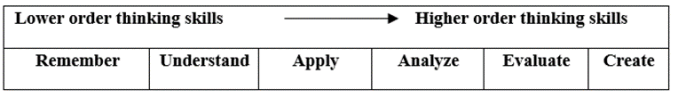


Figure 1.3: Revised Bloom's cognitive taxonomy

Source: Adapted from Anderson and Krathwohl (2001)

Deep learning denotes enjoyable learning experiences. Surface and deep approaches can be used at different times in their learning thought students have the tendency to use a particular way and follow with it (Biggs, 1987; Entwistle, 1981; Ramsden, 2003). Many researchers such as Ramsden (2003) and Tagg (2003) agreed that learning context has significant effect on how students approach learning tasks. Emphasizing human capabilities into the management of knowledge is crucial especially when there is a positive connection between social interactions and the development of higher order cognitive functions. Pointed out by McQuiggan, McQuiggan, Sabourin, and Kosturko (2015), ML fostered higher order thinking skills which in terms strengthened problem solving ability, better communication, facilitated collaboration and creativity. These desired outcomes involve deep learning approach. Despites many potential opportunities, how ML experiences promote deep learning remain a key concern and challenge. According to Rajasingham (2011), there has been ongoing debate as to whether ML could in fact provide deep learning.

1.4 Why self-regulated learning (SRL)

In this study, learning is envisioned as a social practice where the role of contextual norms and the adoption of new behaviors are important elements. Social learning is referred to as the collective enterprise of learning among a group of individuals through social interaction, virtual experiences involving observation, and

active conversation that affects the creation of new ideas (Newig, Günther, & Pahl-Wostl, 2010). And the outcomes of social learning include changes in understanding that may translate to the adoption of common goals, gained trust, or changes in attitudes or behavior. These social learning assumptions and constructs, can be apply to the self-regulated theory in studying the processes in which students use as guide to direct their efforts in knowledge acquisition and skill development in ML. Self-regulation provides social learning, not only with the ability to set standards and goals, but masters them with self-observation, self-judgment, and self-reaction. Hence, students can be described as self-regulated when they are engaged in metacognitive activities, being motivated to learn and behaved appropriately by joining others in the course of the learning (Zimmerman, 1986, 1989). The regulatory behavior of learners will enable better decision making in terms of selection and application of different knowledge gained from social learning. In this sense, the self-regulated learning theory is a useful learning technique for social learning.

Järvelä and Hadwin (2013) suggested that successful collaborative learning depended upon (a) the self-regulatory skills and strategies a student brought into the group (self-regulation); (b) when students used their self-regulatory competence within the group, transitional support occurred (co-regulation); and (c) shared or collective regulation of learning comprised of meta-communicative awareness, shared motivation regulation, and successful coordination of strategies (shared regulation). Roschelle and Teasley (1995) also pointed that students were productively engaged in collaborative interactions when the group was able to effectively coordinate themselves in the shared task space.

There are four assumptions in self-regulated learning that influence successful collaboration. The first assumption states that regulated learning is planned and goal directed. Goals refers to academic tasks and standards for assessing learning. To achieve goals, learners purposefully negotiate task goals and establish standards to guide work. The second assumption sees regulated learning as metacognitive, indicating that self-regulated learners tactically adopt and adapt tools and strategies to improve task performance and learning. The third assumption indicates that monitoring development and taking appropriate actions if results are not as planned. Lastly, regulated learning is social. It is influenced by environmental context, and out of participation, or situated in social activity systems. To comprehend the regulation in learning, students need to know more about their social surrounding and how the regulated learning interplay socially (Schunk & Zimmerman, 1997; Volet, Summers, & Thurman, 2009). Regulated learning continues and adapts in the face of challenges (Schunk & Zimmerman, 1994; Winne & Hadwin, 1998; Zimmerman, 1989).

These assumptions highlight the students' initiative, resourcefulness, persistence, and sense of responsibility in learning (Zimmerman, 1998). For these proactive characteristics to surface, self-motivation is essential and so is the students' self-directed learning competence. Although there have been studies attaching the significance of the student's role in effective ML, the characteristics, the learning processes, and effects of ML, remind primary challenges in the research field of ML (Sharples, Taylor, & Vavoula, 2005; 2010; Wali, Winters, & Oliver, 2008). Sha, Looi, Chen, Seow, and Wong (2012) stated that further research was still needed to include the roles of the learners such as motivation in recognizing and analyzing the mechanisms and processes of ML. Despite a growing body of research examining

how learning technologies can support or foster students' SRL (Dabbagh & Kitsantas, 2012; Kitsantas & Dabbagh, 2010, 2011; Nicol, 2009), there is also a limited number of empirical studies on the effectiveness of the ML teaching methods and design in online or distributed environments that prompts students' self-regulatory behaviors.

1.5 Mobile instant messaging in knowledge creation

To provide a structure to study self-regulated learning behavior, a mobile interactive application is used in this study. MIM is popularly used among students for educational purposes and that it builds stronger social bonds among students and instructors (Rau, Gao, and Wu, 2008). There are some studies on the potential uses of MIM (Attewell, 2005; Holley & Dobson, 2008; Yengin, Karahoca, Karahoca, & Uzunboylu, 2011). Other studies indicate that as a discussion tool, MIM enables interactivity and support greater active collaboration (Bollen, Eimler, & Hoppe, 2004; Holley & Dobson, 2008; Markett, Sánchez, Weber, & Tangney, 2006).

A review of literature however indicates a lack of academic research on how mobile technologies can be used for knowledge sharing purposes (Hussein & Nassuora, 2011) . The new technologies have been said to be accepted superficially without good understanding of the full potential (Graham, 2004), and the impact of MIM on knowledge sharing and learning among tertiary students has yet been well researched upon (Eid & Al-Jabri, 2016). Kennedy et al. (2006) agreed with Sharpe, Benfield, Lessner, and DeCicco (2005) that additional empirical research was required to look into the ways students use MIM apps to communicate, publish, share information and support learning (Conole, De Laat, Dillon, & Darby, 2008). Though past research provides a general overview of MIM usage in education, many are of quantitative nature. Only few papers look into the effectiveness of MIM applications

in higher education, knowledge sharing using MIM as well as co-creation of new knowledge for sustainability. This lack of research prompts researchers such as Ryu and Parsons (2012) and El-Hussein and Cronje (2010) to call for more papers on how MIM can be used to facilitate collaborative learning using the latest mobile technologies.

1.6 Purpose of this study

This study attempts to discover the students' perspectives of ML and investigates how this new learning behavior leads to the construction of new knowledge using MIM applications (apps). This research seeks to capture the actual process and revealing the dominant patterns of interactions displayed among students in group-based mCSCL activities. To identify the students' strategies in constructing knowledge, SRL Theory is adopted to show how regulated learning behaviors and ML experiences co-create new knowledge for effective learning. The findings gives better insights into how students perceive ML and how new ML behaviors alter the learning process. As such, the followings are the research objectives:

1. Understand ML from students' perspective
2. Investigate students' knowledge construction behaviors in mCSCL
3. Identify factors influencing knowledge construction in ML context
4. Study students' SRL strategies for co-creation of new knowledge in mCSCL discussions

1.7 Research Questions

1. How do students perceive mobile learning?
2. How do learners use mobiles to facilitate learning processes?
3. What factors influence mobile learning?

4. How do regulated mobile learning processes facilitate the co-creation of new knowledge in mobile computer supported collaborative learning?

1.8 Scope of Study

The scope of the study is to understand students' perspectives around ML that is how do they socially interact and create new knowledge through interaction provided by mobile apps. Data are collected based on the text, voice recordings and video clips from their mobile instant messaging applications such as the Line, WeChat and Facebook Massager applications. All the students shared a common Line group to facilitate communication and transparency in interaction that involves learning activities. Although the principle applies to any mobile devices and many applications, some mobile devices are more limited than smartphone because of their dependence on Wifi. The technological considerations such as the type of devices, the social media applications and cloud services are not being analyzed in this research. This study focuses primarily on the interaction between students and the community of learners that has been enabled by mobile devices. The scope is also confined to the crossing of the space boundary. The observation is based on both in-class and on MIM interactive behaviors and messages. This study comprises of a pilot study and case studies based on two classroom action research. The teacher's perspective is however not included in this study as the research focuses on the learners' perspective. The research is conducted in a private university in Thailand.

1.9 Significance of the Research

This study on new knowledge co-creation via MIM applications attempts to understand students' behaviors and preferences in the way they learn today. The students' perspective is crucial as the findings indicates the need for

change in the way universities assess learning outcomes and recognizing the potential of informal learning in knowledge building especially on the interaction with stakeholders in the course of learning. The research findings allow teachers to see the importance of social interaction for meaningful students' engagement and envisage learning outcomes from a knowledge management perspective in terms of gaining new knowledge through co-creation, applying new information to existing knowledge and the sharing and transfer of knowledge (Mohamad & AlAmeen, 2014) to alleviate learning performance. Figure 1.4 , highlights the effective learning process model by Mohamad and AlAmeen (2014). The development of higher-order thinking skills is an important learning outcome.

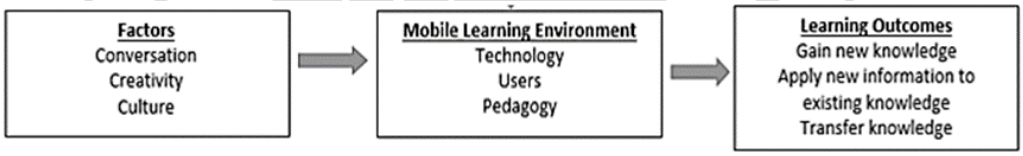


Figure 1.4: The effective learning process model

Source: Adapted from Mohamad and AlAmeen (2014)

Academic achievement does not equate simply with academic grades, but also the nurturing of higher-order cognitive abilities such as critical thinking and problem-solving. To ensure active learning engagement, insight to the higher-order cognitive processes is desired (Bonwell & Eison, 1991) for it enhances the facilitation of knowledge construction by the students (Meyers & Jones, 1993). More significantly, the research approach may lead to the development of a new theory for ML as a way to consolidate current ML research field. Noted by Churchill (2011), present research on educational technology showed inadequate attention to the

pedagogical design of learning useful MIM and their roles in learning experiences. This research also suggests the refocusing of a more balanced definition from the Who, What, When and Where (Thüs et al., 2012), to one that gears towards the Why and How dimensions to reflect active and deep learning which signifies an effective learning process in the ML environment. Hence, the research brings to the attention of academics to rethink the criteria for course design, evaluation and assessment of student performance. Figure 1.5 shows the significant of the research trend in comprehending the use of mobiles for effective learning and the co-creation of new knowledge for the sustainability of ML .

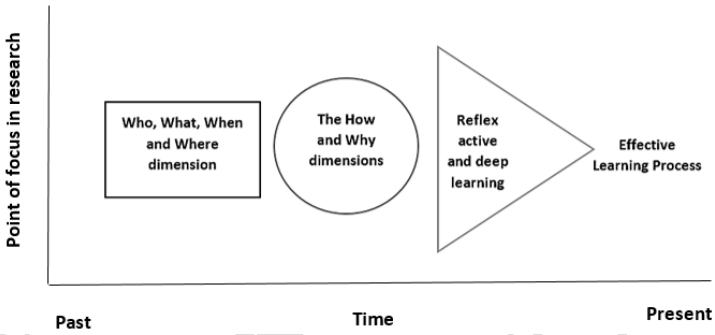


Figure 1.5: Research trend in mobile learning

Source: Researchers' own composition

More significantly, considering the increasing usage of mobile in learning, the research focusing on the management of knowledge in the ML environment is timely. In education, the practice of knowledge management is still underperforming (Bedford, 2013). Many courses are still content-based, confining traditional teacher-centered teaching approaches. With greater emphasis on active and collaborative learning in higher educational institutions, students now have to shoulder more responsibility for their learning. They have to be the readers, writers, speakers,

listeners, and thinkers in and out of the classroom through active engagement in social interaction with others (Alvermann & Phelps, 2002; Vacca, Vacca & Mraz, 2011). Socially interactive learners are seen as engaged learners (Vacca et al., 2011) which means they will learn and gain more when they actively involved in interacting with each other (Routman, 2005, p. 207). As such, this research looking into the regulatory behaviors of the learner and among the learners provide in-depth understanding into the ways students manage learning and create new knowledge in the ML environment. This is crucial because the findings will be important indicators for academicians to rethink what is to be learned and how it should be learned. Ultimately, the study brings new light to the concept of the co-creation of new knowledge in a social interactive learning environment adding greater values to learning experiences and enhancing learning outcomes.

1.10 Conceptual Model

For this research, as presented in Figure 1.6 on the page, a socio-constructivist conceptual framework is developed to understand the knowledge co-creation process of learners in mCSCL using MIM applications to undertake the learning task. As social learning takes place through a series of interactions, the socialization context is essential in the building up of new knowledge and greater opportunity of the co-creation of new knowledge. The regulatory behaviors of students, enhance the learning experiences, allowing deeper learning. The engagement in collaborative learning and efforts in co-creation of new knowledge further generate value in learning. These in terms signify the effectiveness of ML in an mCSCL environment.

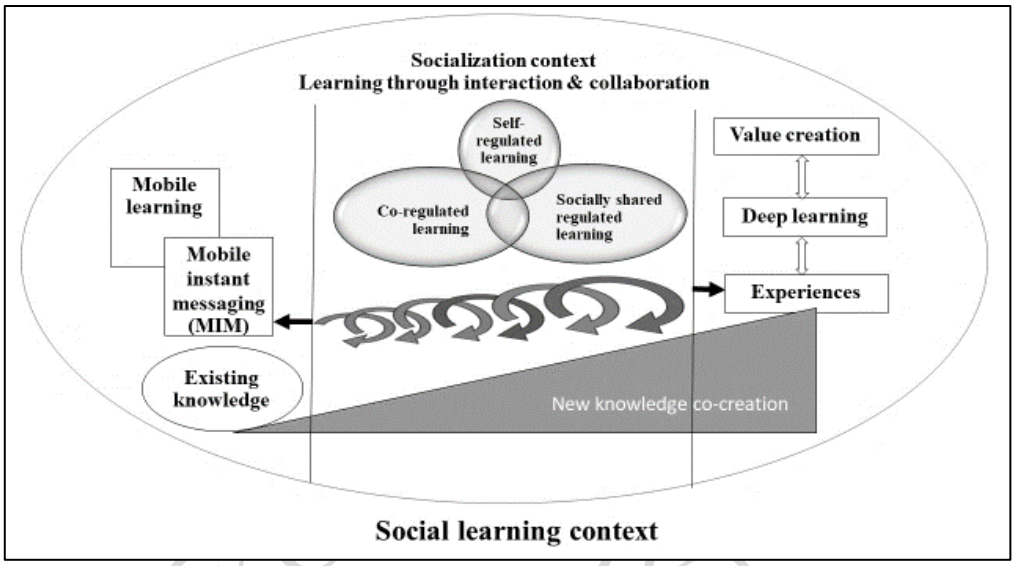


Figure 1.6: A new conceptual model: Strategic co-creation of new knowledge in mobile computer supported collaborative learning

Source: Researcher's owes composition

CHAPTER 2

LITERATURE REVIEW

The first section of the LR, focuses on the evolving definitions of ML. There are a variety of ways to define ML but many are device based and related to e-learning with little addressing on the relationship between mobile technology and learning. Current research calls for definitions that focus on the learning and the learners' experiences. To deliver a balance definition, the researcher examines the context appropriate for ML. Adopting a socialization context helps to reflect the actual and not just potential ML experiences of students.

2. Introduction

A great deal of attention has been shown in the field of education with the emergence of the wireless technologies and the introduction of many mobile-device innovations (Sung, Chang, & Liu, 2016) This new phenomenon is at its early development and testing stage with rapid changes and growth (Barreh & Abas, 2015; Hung & Zhang, 2012; Hwang & Tsai, 2011; Kearney, Schuck, Burden, & Aubusson, 2012; Kukulska-Hulme et al., 2011; Ntuli & Suh, 2015; Wu et al., 2012). Learning with mobile devices has become an expected (Lan & Huang, 2012) integral part of college life and culture (Johnson, Becker, Estrada, & Freeman, 2014; Lepp, Barkley, & Karpinski, 2015; Vázquez-Cano, 2014). Research in the field of ML may be diverse but it is not well connected. The ubiquitous nature in defining ML makes this field of research complex and difficult to grasp. There is no one agreed definition even though the concept of ML has evolved over time. ML has been described in numerous ways by various researchers (Frohberg, Göth, & Schwabe, 2009; Kearney

et al., 2012; Sharples, Arnedillo, Milrad, & Vavoula, 2009; Vázquez-Cano, 2014). ML can be better understood from 3 perspectives, namely the technical characteristics, the pedagogical aspects and knowledge creation viewpoint. These 3 considerations are fundamental to understanding the ML processes and how they accelerate towards new knowledge building in learning.

2.1 Technical consideration of ML - Techno-centric definitions

Based on past literature, Traxler (2010) identified 3 categories of definitions for ML, as shown in Figure 2.1. The early approach to defining ML centers on the functionality of the mobile devices, and is often referred to as any educational provision where the main technologies are handheld devices (Traxler, 2005, p. 263) or on the mobility of technology and as E-learning using mobile computer-supported devices (Quinn, 2000). The next generation of definitions however shifts towards the concept of movement. These definitions however, are largely tilted towards the mobility of technology. The third category, de-emphasizes the technological aspect and places weight on the mobility of the learner and learning processes.

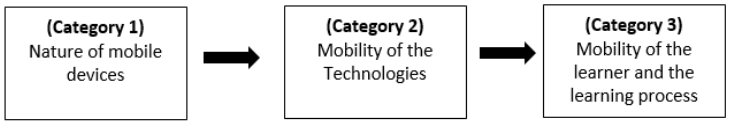


Figure 2.1: Three categories of ML based on past literatures

Source: Adapted from John Traxler (2010)

In the techno-centric oriented definitions, ML is considered as learning using mobile devices such as mobile phones. Quinn (2000) described ML as learning with the help of mobile devices. Seppälä and Alamäki (2003) provided a pictographic

definition of the mobile devices in learning. Technically, smartphone is embedded in the mobility element with the types and functionality of handheld equipment and access to internet. Figure 2.2 illustrates the technical definition of ML devices in diagrammatic form. Although technology of the devices continues to change rapidly, these influencing factors remain reasonably consistent.

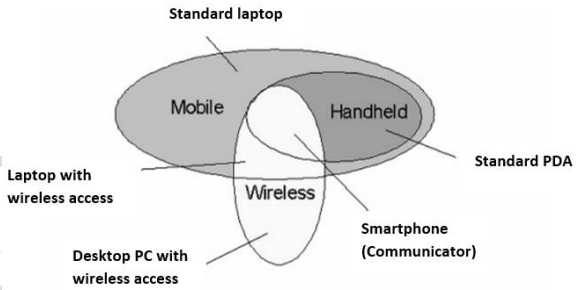


Figure 2.2: Mobile device from a technical perspective

Source**:** Seppälä and Alamäki **(**2003**)**

Turunen, Syvänen, and Ahonen (2003), on the other hand regarded mobile device as a pervasive channel that could help students to synchronize work, study and leisure time in useful ways. Kukulska-Hulme, Evans, and Traxler (2005, p. 1) reinforced the concept of technology stated that ML delivered learning that was exclusively by wireless and mobile devices and their technologies. Sharma and Kitchens (2004) refined ML as learning that was supported by mobile devices, ubiquitous communications technology and intelligent user interfaces. Parsons and Ryu (2006) deviated into the delivery of learning content to learners using mobile computing devices. Georgiev, Georgieva, and Smrikarov (2004) believed that the definition should be wider and not just including internet based notions. Sharing the same emphasis, Lehner and Nosekabel (2002, p. 103) interpreted mobile education as

any service that improvised learners with broad electronic information and educational content that accelerated knowledge acquisition regardless of place and time. But these definitions are strongly associated with technology and not learning. O'Malley et al. (2005) thus concluded that ML was any type of learning that occurred when and where the learner was not in a predetermined position. The definition however detaches the kind of devices used and directs to the mobility of the learner rather than mobility of devices used. Kukulska-Hulme et al. (2005, p. 1) admitted that these definitions were restrictive, for they laid emphasis on the technology and unconcerned about the learning itself. As such, Kukulska-Hulme et al. (2005) urged for a definition that included the learning and the learners' ML experiences.

2.1.1 An extension of E-learning

ML is perceived as the crossroads of mobile computing and E-learning where individuals are unconstrained by location in time or space to search and obtain resources, or engaging in rich interaction that can support effective learning and assessment of performance (Quinn, 2000). Likewise, Traxler (2005, p. 263) debunked that simply positioning ML "somewhere" on the E-learning's continuum of portability was inappropriate. Although these definitions take into consideration the E-learning condition, they are still technically orientated and overshadowed by usage of the devices. Traxler (2005, p. 263) recognized the limitation of the 'rather techno-centric", citing that such definitions were unstably based on "around a set of devices". In contrast to E-learning, ML mainly refers to mobile technology. To overcome the limitation in definitions, Polsani (2003, p. 11) introduced the term 'network learning' (or 'nlearning') denoting ML as a method in learning where the content generation, distribution and application of the learning are

based on the network. It is therefore difficult to come up with a general definition for ML and simply substituting ML to E-Learning is not a reliable way to assess learning experiences. The E-learning trend is mixed and enhanced with ML alternatives (Hewagamage, Wickramasinghe, & Jayatilaka, 2012), but mobile devices potentially can make learning widely available and accessible. This perspective of ML which implicitly means mobile E-Learning is however perceived with inadequacies and limitations because they are based on the definition of E-learning and this itself is difficult to conceptualize and hinders identifying the unique nature of ML.

ML is principally about the learners' mobility and the quality learning that allows anywhere or anytime learning (Ally, 2009; Laouris & Eteokleous, 2005). This research therefore suggests the refocusing of a more balanced definition from the Who, What, When and Where (Thüs et al., 2012), to one that gears towards the Why and How dimensions to reflect active learning which signifies an effective learning process. To do so, the researcher first examines the relevance of the environment for the learning context as well as the level of complexity as against the pedagogical ambition of the learners.

2.1.2 Context Categorization of ML

For learning to be effective and meaningful, it needs to occur inside a right context that exhibits real world characteristics. For a balance definition, it is essential to observe the learning ecology to identify appropriate context of ML. Barron (2006, p. 195) described learning ecology as "the set of contexts found in physical or virtual spaces" that allowed learning to take place. Context is a vital part in learning (Hwang, Chen, Shadiev, Huang, & Chen, 2014; Shadiev, Hwang, & Huang, 2015) and can be established in many approaches.

Context is the coming together of the properties of the physical location (where the learning occurs) and rules and division of work (in the community of the learner) (Wali et al., 2008, p. 56). With internet connections, there are no control of the when and where elements which means that one can surpass the physical boundaries and restrictions in the learning setting (Westera, 2011). The key to understanding the context of ML is that context helps in the planning of the ML environment. Developing learning content that is according to the present context of the learner is regarded as significant to attain the aim of ML (Al-Hmouz, Shen, Yan, & Al-Hmouz, 2010).

Yelland (2006, p. 122) cited that learning using technology required more than digitalizing learning activities, but also to create 'contexts for authentic learning' that integrated new technologies to improve the generation, communication and dissemination of ideas'. In authentic learning, students connect classroom activities to their lived experiences and to their lives. In such context, students are not solely controlled by teachers. According to Hwang, et al. (2014), an authentic environment offered contexts that showed the way knowledge could be applied in real and practical situations. The authenticity in learning has real-world significance and allows learners to share their learning and gain insight to the experiences of different expertise. Current teaching strategies like problem-based learning (Barrows & Tamblyn, 1980), action learning (McGill & Beaty, 2001), situated cognition (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991), and experiential learning (Kolb, 1984) all stress the importance of the learning contexts. Identifying an appropriate context enables learners to clearly associate concepts with their practical counterparts and apply knowledge for action. As part of the learning system, the informal and or out-

of-school settings offers virtually boundless chances to develop one's learning. These learning experiences influence a learner's overall learning success (Falk & Dierking, 1998; Hull & Schultz, 2001). Students' learning across formal and informal contexts is a reflection of changing knowledge requirements for learning in society. The concept of learning across multiple contexts has been mentioned by Sharples et al. (2010) and Pachler, Bachmair, and Cook (2009). Context crossing incorporates the integration of formal and informal learning environments (Cook, Pachler, & Bradley, 2008). The cross boundary in learning is seen as a method involving the management and integration of different managing and integrating divergent social activities and communications for meaning-making purposes (Walker & Nocon, 2007). But with traditional practices of schooling still prevailing, the concept of cross context learning is still not well dealt with. Restricting learning to one setting will overlook focal interdependencies between multiple settings of learning. Describing learning in a metaphoric way as less of parking lots and more of intersections, (Leander, Phillips, & Taylor, 2010) put forth the idea that learners concurrently participate in different communities as a part of their daily life. As such, the variations in both physical and social contexts distinguish ML from static learning. The traditional concept of learners as 'consumers' in relatively static contexts created for them has now being transformed with the new ICTs and the informal learning networks arising around them opens up possibility of learners generating their own educational contexts (Whitworth, 2008). Researchers have made attempt to categorize the ML contexts. Kukulska-Hulme, Traxler, and Pettit (2007) identified 8 emergent categories and ML contexts which include the followings:

(a) Technology-driven ML

(b) Miniature but portable E-learning

(c) Connected classroom learning

(d) Mobile training and performance support

(e) Large-Scale Implementation

(f) Inclusion, assistivity and diversity

(h) Informal, personalized, situated ML

(i) Remote, rural and development ML

Although these categories of ML are helpful, there is an absence of research connecting the potential use with actual practice. Therefore, to reflex the multi-contextual nature of ML, Frohberg et al. (2009) provided 4 context categories relevant to the environment and learning. Figure 2.3 illustrates the classification by contexts.

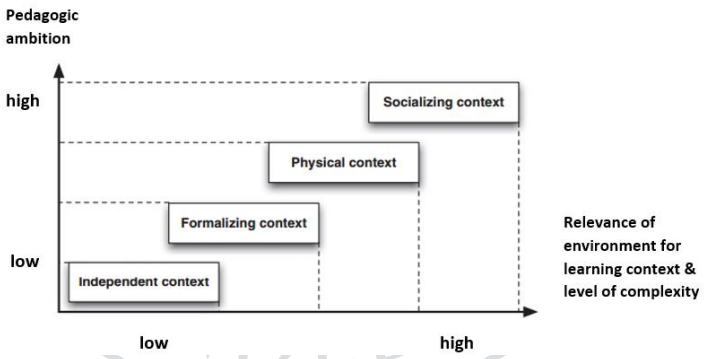


Figure 2.2: Classification of ML by the factor ‘context’

Source: Adapted from Frohberg et al**. (**2009**)**

Independent context refers to the environment in which the learner does not have a relationship to where the learning takes place. Formalized context denotes a classroom-like setting. Physical context is the place where learning occurs. Socializing context has a wider scope including the sharing of the learning and interpersonal relationships such as the current or past situations, emotions, friends and

learning history and this embeds everyday learning situations and learning informally (Frohberg et al., 2009, p. 8). As Frohberg et al. (2009) classification did not incorporate mobile simulation learning activities, Cornelius and Marston (2009) added the fifth context. The virtual context encompasses simulation activities using instant messaging transports learners into a world that exist in parallel with their physical and social experience. To discover learners' experiences in using MIM for learning purposes, the socializing context is adopted. To Koole (2009), social context is where people interact socially in a cultural surroundings with commonly accepted communicative rules. There may be disturbances in the social context of the learning. The structure of the socializing context as shown in Figure 2.4, is based on the ML Analysis Framework (Sharples et al., 2010; Taylor, Sharples, O'Malley, Vavoula, & Waycott, 2006), focusing on the tools, control element, context, object, communication and subjects.

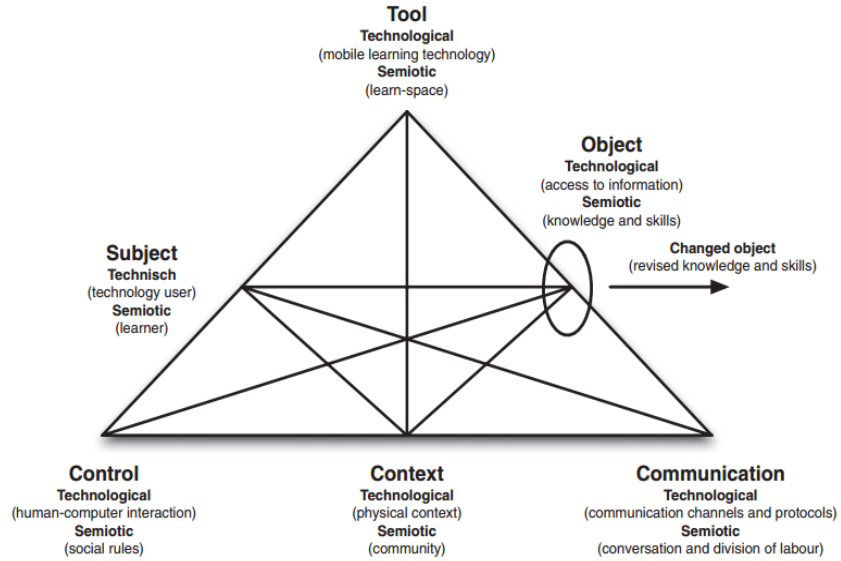


Figure 2.3: The structure of the context based on the Task model in mobile learning

Source: Adapted from Sharples et al. (2010); Taylor et al. (2006)

2.1.3 Socializing Context

The context of being is free from the context of learning (Frohberg et al., 2009). An overview of the structure, issues and scale for socializing is presented in Table 2.1. In a socializing context, interpersonal relationship of the past or present to the learners is developed and sustained. Unlike the formalized context of a classroom-like setting, the social context comprises informal learning (Dohmen, 2001) where community of learners act as mutual peers coaching to exchange and reflect on their everyday situations for learning purposes.

Table 2.1: Structure, issues and scale for socialization based on Task model

Factors	**Issue**	**Scale**
Context (Where and when)	Relevancy of environment and learning issue	Socializing context
Tools (Where with?)	Pedagogic role of tools	Content construction
Control (How?)	Tightness of control	Full learner control
Communication (With whom?)	Social setting	Cooperation
Subject (Who?)	Previous knowledge	Expert
Object(ive) (What? And Why)	Level	Synthesize and evaluate

Source: Adapted from Frohberg, Göth, and Schwabe (2009)

Tools are used to mediate a learning process and include the material use, the medium or channel, artefact, instrument, content and the device. Tools create a scale of effects ranging from reflective data collection, delivering content created, interact to motivate or for control purposes, and help construct contents. In this context, learners work enthusiastically with tools to produce student-generated content. This approach may take time but students gain better understanding of their learning and able to apply their knowledge effectively as a result (Frohberg et al., 2009). This is what this research seeks to discover and gather evidences from the ML practices.

When students assume the responsibility, and follow a meaningful learning process with an acceptable target, the control element sets in. Control varies from strict teacher control to total learner control. In the socializing context, learners are able to plan learning process and decide the learning goals. However, full learner control can overstrain learners leading to failure in performing meaningful activities (Dubs, 2005). Hence, optimizing control level is recommended (Frohberg et al., 2009). With communication, learners are not isolated. Learning becomes social and is not confined only to an individual. The learning process encompasses conversation with learning group, such as the instructor and other students in the class (Mandl & Reinmann-Rothmeier, 2001). The communication scale indicates the level of interaction between different learners in a learning environment. In the socializing context, collaboration between the teams to fulfil the learning goal is a priority. Students can collaboratively generate their own knowledge (Frohberg et al., 2009) as collaboration using mobiles can provoke deeper reflection and cooperation. In the socializing context, subjects or the learners have relatively high level of previous knowledge. According to Anderson et al. (2001), the objective of ML should no longer limit itself to remember and comprehending the learning, but on higher orders of thinking such as supporting learners in applying, analyzing, synthesizing and evaluating their knowledge as suggested by Bloom (1956) under the Bloom's taxonomy. Researchers such as Al Hamdani (2014) reckoned that the best use of mobile devices was in developing higher level of thinking skills and in problems solving.

Noticeably, from the social context, mobile enables "exploration and conversation across multiple contexts amongst people and interactive technologies. The traditional context of learning has experienced radical changes in teaching and

learning. New alternatives to education and training systems have emerged with greater collaboration between schools and corporations. When learning activities gradually move into the practical sphere, context crossing takes place making ML socially interesting. Hence, the organizational context becomes indispensable in the studying of ML. Rethinking ML in terms of context crossing gives a new perspective in defining ML.

2.1.4 Defining ML in the Socializing context

As mentioned by Säljö (1988, p. 35), attaining the "learner's perspective on the learning and teaching activities is essential" to comprehend the new ML phenomena for improvement in education. Thus, in adopting a socialization context, the researcher seeks to refine a definition that reflects students' perspective and focuses on effective learning where mobile interaction takes place across different contexts rather than locations. In this social context or situational context as described by Fischer (2011) and Anderson (2008, p. 5), "synchronous online learning as learning that occurs through interaction between people and personal interactive technologies in an effort to generate new knowledge using mobile devices". It denotes using the Internet to gain access to the learning materials which implies interacting with the content, instructor, and other learners. Interaction in the social context enhances student learning experiences as it supports knowledge acquisition and meaning-making of the learning. Sharples, Taylor, and Vavoula (2007, p. 225) further defined ML as the processes of coming to know via interaction across multiple contexts. Within the socializing context, the definition also embraces the notion that people interact with more and different communities of actors, (both people and the interactive technology) with a common objective.

In this study, the operational definition of ML is a mobile supported social collaboration process where learners with their personal communication tools engage in interaction with and beyond one's boundary to share and generate new knowledge. This definition embeds the concepts of mobile learners, mobility of technology, mobility of learning and new knowledge creation of learners. The definition explains the underpinning processes through which learners create meaning by exploration and discussion. The process is mobile in nature and it transcends the physical and conceptual boundaries through conversation allowing learners to build a link between experience and concept in order to create new knowledge or meaning. A mobile learner is one that can learn from any location while doing other tasks and the learning materials used are flexible, boundless and allowed for interaction and multitasking (Dunlap and Lowenthal, 2011). The definition also relates to the mobiles abilities to create (with pictures, videos, audio and text), share, connect, communicate, collaborate, and co-create through the crossing of boundaries (such as community of practice and social media) to provide a powerful mobile ecology to increase learning opportunities.

The first section of the literature review focuses on the socialization context of ML and the delivery of an operational definition of ML. The following LR discusses the transformational shift from constructivism to social constructivism. Integrating Social Constructivism Theory with technology opened new possibilities for mobile Computer-Supported Collaborative Learning (mCSCL).

2.2 Pedagogical Consideration for ML

The use of technology in learning needs to be based on educational theories and certain pedagogical considerations (Patten, Sánchez, & Tangney, 2006a). Technology as a learning 'partner' does not necessary means that the tools will "scan and scroll down" the amount of information required, but to reinforce learning by facilitating students to make best use of their mental efforts (Jonassen, 2006; Jonassen, Carr, & Yueh, 1998; Kirschner & Wopereis, 2003). Gilakjani, Leong, and Ismail (2013, p. 49) proposed that technology led to new learning styles, innovative student-centered instruction and higher-level thinking orders. In a constructivist learning environment, students can use the mobile technology to create a product that they can present to teachers and fellow students to review, learn, or critique in a collaborative manner. Mobile devices are actually rather neutral to any teaching and learning theories (traditional or emerging). Learning theories, however can be grouped into three categories. First, Behaviorism. Second, Cognitivism and the third category is that of Constructivism (Ertmer & Newby, 1993; Leidner & Jarvenpaa, 1995; Sheng, Siau, & Nah, 2010). The focus of learning today has apparently shifted from the Behaviorism and Cognitivism models to the Constructivism model. Applefield, Huber, and Moallem (2000) saw students' role in Constructivism as one that built and transformed knowledge.

2.2.1 A shift from Constructivism to Social Constructivism

Naismith, Lonsdale, Vavoula, and Sharples (2004, p. 2) viewed learning in a constructivist approach as an active process where students constructed new ideas or concepts using their present and prior knowledge. Students

are encouraged to be “active constructors of knowledge”. Constructivist approach has two types of perspectives which Kanselaar (2002) termed as constructivist perspective and social-cultural perspective or socio-constructivist perspective. Seemingly, there is a shift in the teaching trend from constructivism to social constructivism (Green & Gredler, 2002; Hodson & Hodson, 1998; Palincsar, 1998). While constructivism advocates that individually, students can mentally construct the world of experiences via their cognitive processes, social constructionism take a more social and less individual focused (Young & Collin, 2004). The general view of social constructivism is that human knowledge is socially constructed through social processes and actions (Young & Collin, 2004) and how a student interprets this knowledge is influenced by the social and cultural contexts to which the knowledge is constructed (Hung, 2001). Figure 2.5 demonstrates the shift in focus in learning theories from Constructivism to Social Constructivism in the way students construct knowledge.

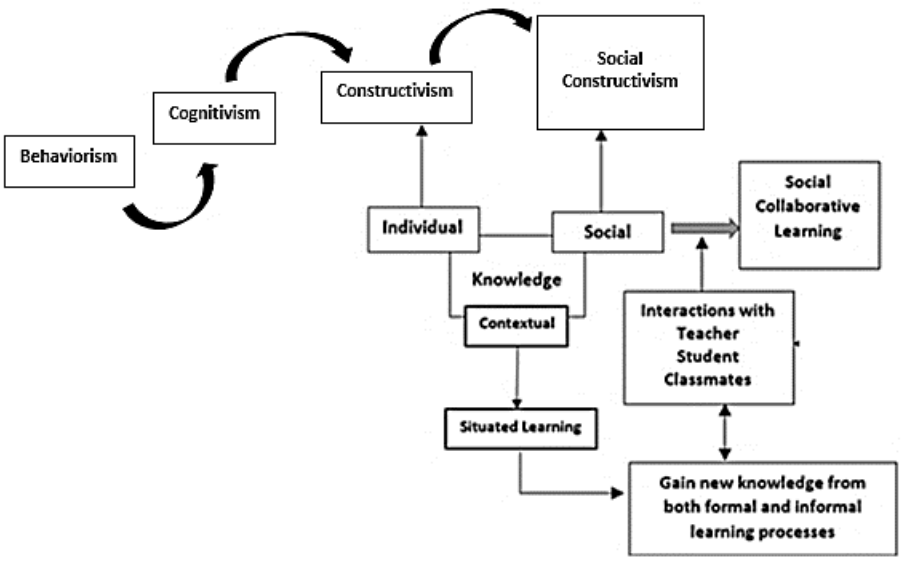


Figure 2.4: The Shift in focus from Constructivism to Social Constructivism Theories

Source: Researcher’s own elaboration

2.2.2 Social Constructivist view of teachers, students and community of practices

Based on Social Constructivist Theory, technology enables learning approaches to situate the learning and application of knowledge stressing on problem-based instruction, mutual teaching, collaboration among peers, cognitive apprenticeships, web quests, anchored instruction, and other methods that involve practitioners or community of learners (Schunk, 2000). Vital components of a society's practical knowledge include the relationships among practitioners, their practices, the social organization and the communities of practice they are in (Lave & Wenger, 1991; McMahon, 1997). Taking the role as facilitators (Bauersfeld, 1995), teachers demonstrate a completely different set of skills (Gamoran, Secada, & Marrett, 2000). Instead of telling, facilitators ask and move from the front and support learners at the back. Providing guidelines so that learners arrive at their own answers and conclusions. As facilitators, they are enthusiastically engaging in interactive dialogues with the students (Rhodes & Bellamy, 1999). Hence, the critical and most important goal in social constructivism is to assist students to becoming effective thinkers (Di Vesta, 1987). This aim can be reached when instructors adopt multiple roles and engage the viewpoints of the students in the interactions. Social constructivism therefore recognizes the unique characteristics and complexity of the students and includes their experiences and knowledge in the dialogue. This approach inspires, exploits and rewards students as an important part of the learning process (Wertsch, 1985). Social constructivism promotes the learner's own interpretation of the truth that is influenced by one's background, culture or knowledge of world. The

learner's background also helps to shape the knowledge and truth that the learner creates, realizes and gains in the learning process.

For social constructivists, the process of knowing comes from the social interaction (Glasersfeld, 1992) focusing on the role of the greater community and the role of others who are of significance to the learning (Vygotsky, 1978, p. 30). The establishment of social relationship opens the window to learning rather than through the simple acquisition of knowledge (Lave & Wenger, 1991). Wertsch (1985) added that acquisition of social meaning of important symbol systems and learning how to adopt and adapt them depended on the social interaction with others who are more knowledgeable. According to Vygotsky (1978), social environments supported reflective thinking and complex problem solving by requiring students to develop from less-to-more-experienced members of the community (Jones & Bronack, 2007, p. 154). This signifies the recognition of community of practices (CoPs) influence in collaborative learning. Hildreth and Kimble (2004) referred CoPs to a group of professionals informally connected to each other by exposing themselves to common problems, shared solutions, and embodying a store of knowledge. Wenger, McDermott, and Snyder (2002, p. 7) refined with the inclusion of interaction citing that CoPs as "groups of people who have a commonly concern or problem, or having interest in the same topic, and who expanded their knowledge and expertise in the particular area by interacting on a continuous basis". Researchers such as Wenger (1998a), Wenger (2007), Allee (2000), and Lave (1988) also emphasized on the regularity of the interaction as significant characteristics of CoPs. Wenger (1998b) reinforced that CoPs share mutual understanding of how something was done and the involvement of constant negation about this. This mutual understanding manifests

itself in different artefacts in a process of reification. New knowledge and understanding creep into a practice piece by piece through those processes of negations (Weiss, 1990). From these definitions, the concept of CoPs can be seen as closely associated with the Social Learning Theory by Bandura (1977a) where learning is a social phenomenon and is placed in the context of people's lived experience and participation in the world (Wenger, 1998b, p. 3). Relationships in CoPs are based on reciprocity whereby members mutually build shared norms, cooperate to develop shared repertoire, create a set of communal resources that include a common professional language, accustomed routines, common set of tools, sensibilities, artifacts and stories. The exchange of knowledge in cross boundary among members of various communities in different organizations is useful stakeholders. The community members gain and reflect from others' knowledge on different problem-solving situations, stay ahead of changes within their work practices and improve own skill-sets (Voutsina, Kallinikos, & Sørensen, 2007). Thus, communities are key source for knowledge creation (Galliers, 2011) especially in building knowledge repositories that represent valuable sources of information, learning and innovation for organizations.

2.2.3 Social constructivism and knowledge construction

To overcome diverse perspectives in constructivism, Hoover (1996) introduced 2 important concepts to cover the simple idea of constructed knowledge. The first notion is that students use their existing knowledge to construct new understanding. This means that learners' prior knowledge have a certain level of influence in new knowledge construction. Prior knowledge is what an individual already known about the content (Marzano, 2004; Stevens, 1980). It is "all

knowledge people have when coming to a learning environment and has relevancy towards the acquiring of new knowledge (Biemans & Simons, 1996, p. 6). Prior knowledge is dynamic and multidimensional consisting of different types of knowledge and skills (Dochy, De Rijdt, & Dyck, 2002; Dochy, 1992; Hailikari, Nevgi, & Lindblom-Ylänne, 2007). The amount and quality of prior knowledge positively influence knowledge acquisition and the capacity of the students to use higher-order cognitive problem-solving skills (De Corte, 1990; Dochy, Segers, & Buehl, 1999; Dresel, Ziegler, Broome, & Heller, 1998; Nathanson, Paulhus, & Williams, 2004). Surface learning occurs when students try to learn something with no adequate prior knowledge and resort to repetition memorization. Students then cannot relate the new knowledge to their existing knowledge frameworks (Dochy et al., 1999; Weeks, Lyne, & Torrance, 2000) and may face difficulties in advancing in the particular subject area. In other words, if students have sufficient knowledge gained from their past experiences, this prior knowledge will influence what new or modified knowledge they will construct from new learning experiences.

Learning is not passive according to Hoover's second notion of knowledge. Learning is seen as an active process where students negotiate their understanding with what they experience in the new learning situation. If what students face is not consistent with their current understanding, they can change their current knowledge to adjust to the new experiences. Thus, learners do not act passively but remain proactive throughout this learning process. Hoover's new knowledge experience notion has been supported by Cook (1992) and Bruner (1992) advocating the use of negotiation in the curriculum. Cook (1992) cited that when learners negotiated, asked questions, and tried hard to find the answers themselves, what they learnt would be

more meaningful to them. According to Bruner (1992) having a greater say in planning the program or syllabus meant inviting students to participate, and to make modification to the learning and in doing so, generated a sense of practical involvement in both the learning journey and the results. This kind of curriculum creates a sense of ownership for the students and motivates them to be committed in their learning. Figure 2.6 shows prior knowledge and active learning as the two principles to new knowledge construction.

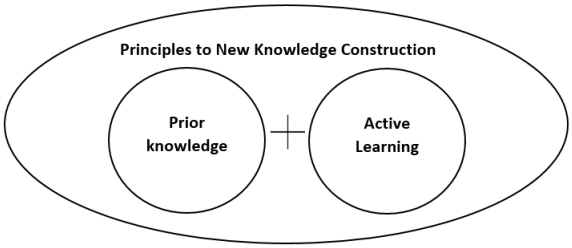


Figure 2.5: Two notions for new knowledge construction
Source: Adapted from Hoover (1996)

In this research, new knowledge is socially formed by people who interact socially with identified people possessing the desired knowledge and expertise. Students, teachers and CoPs have different knowledge that they can use together to construct new shared understanding and this can never be possible without conversing. As such, collaborative practices 'have an important role as triggering elements for individual cognitive processes' (Valtonen, 2011, p. 22). According to King (1990), students engaged in cognitive, metacognitive and social skills. They reflect on their new experiences and rethink how the shared experiences and their existing understanding help to improve and fine-tune their world's view.

2.2.4 Integrating Social Constructivism Theory with technology

Aldoobie (2015) stated that there would be greater impact of Social Constructivism if the theory integrated with technology. Social interaction is an important factor in collaborative learning. Social Learning Theory stresses that learning happens within a social context, where people learn by seeing and following other learners' behaviors (Bandura, 1977b; Hung, Looi, & Koh, 2004). Collaborative learning can help to strengthen learner engagement (Gokhale, 1995) and stimulates higher-order thinking for critical thinking to take place. As students become active in learning so are their sense of responsibility to it. These positive attitudes according to the Social Constructivism Theory support the development of higher thinking skills that can help the students to solve complex problems (Bonwell & Eison, 1991) and facilitate students to construct knowledge (Meyers & Jones, 1993). To effectively engage in collaborative learning tasks, Johnson and Johnson (1994) introduced five basic success factors comprising face-to-face promoting interactions, positive interdependence, interpersonal skills, individual and group processing. Among these five factors, face-to-face interaction can be changed into synchronous interaction, that is communicating at the same time from different locations, or asynchronous interaction, sending, reading and responding to messages as one's schedule permit, if supported by mobile devices. As such, social learning can be experienced in mCSCL since ML enables seamless social interaction with advanced functions such as mobility and instant connectivity (Ryu & Parsons, 2012).

Rieger and Gay's (1997) 4-level mobility hierarchy model indicated that the higher the level of mobility, the greater the intensity would be in communication and

collaboration. Higher level of mobility allows greater group work to be performed. Lower mobility tends to focus on productivity, individual learning based and is content intensive. Figure 2.7 illustrates the Mobility Hierarchy model of Gay et al. (2002).

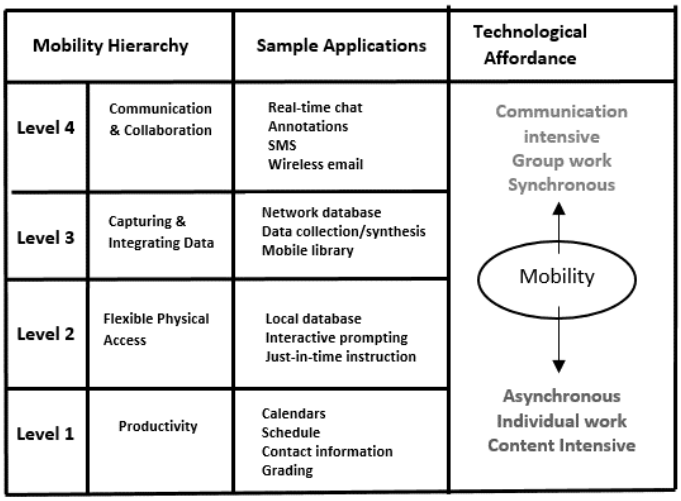


Figure 2.6: Mobility Hierarchy Model

Source: Adopted from Rieger and Gay (2002)

The development of mobile applications opens new possibilities for mobile based collaborative learning (Zeman, 2011). Researchers such as Hsu and Ching (2013), Laurillard (2009), Stahl, Koschmann, and Suthers (2006) also indicated that there were many ways to use mobile technologies in the collaborative learning context. Hsu and Ching (2013, p. 113) suggested that future research needed to examine ways to encourage collaboration and interaction using mobile devices and widened the context to tertiary level because there was an urgent need to study the impacts of mobile technologies on collaborative learning especially when mobile technologies played dominance roles in students' day-to-day living.

The above discussion explained the learning mechanisms from the socio-constructivist approach which reflects the difference in the cognitive processes. The LR further expands into the mCSCL paradigm with emphasis on social interaction. The concept of MIM is introduced to bring about the benefits and potential of ML with learning technologies. Two important research gaps are mentioned. First, the need to explore the way students regulated their learning and collaboration in ML environment and second, the distinctive student behavioral and performance patterns in a MIM supported course. Types of interaction in mCSCL are discussed

2.2.5 Mobile Computer-Supported Collaborative Learning (mCSCL)

mCSCL is defined as using mobile devices to enhance collaborative and cooperative learning that comprise of a small group of students working together to make best use of their own and other's learning (Resta & Laferrière, 2007; Stahl, 2006; Zurita & Nussbaum, 2004a, 2004b). mCSCL represents a new paradigm of collaborative learning that does not replicate traditional learning scenarios (Amara, Macedo, Bendella, and Santos, 2016; Patten et al., 2006a) because it offers new learning opportunities, which cannot be reached without mobile technologies (Patten et al., 2006a). Hence, it is not appropriate to equate mCSCL as "mobile + CSCL" (Looi, Wong, & Song, 2013). Each paradigm has its particular environments, technologies, characteristics, practices and objectives. Like computer-based collaborative learning, mCSCL is mainly text-based and enable students to freely convey their views and ask questions unlike the sense of restriction in traditional classrooms (Kitsantas & Chow, 2007; Rau et al., 2008; Ting, 2013). As such, mCSCL can cater to students' need by providing situated learning environments

(El-Hussein & Cronje, 2010). Hsu and Ching (2013) conducted a review of empirical studies on mCSCL, noted that there are multiple ways mobile computing could help in the mediation of meaning-making in joint activity. Particularly, mobile devices can:

1. Facilitate the sharing of information and the provision of instant feedback (Zurita & Nussbaum, 2004a)
2. Offer individuals with different parts of a group learning task and manage interaction that relates to the task (Boticki, Looi, & Wong, 2011; Roschelle et al., 2010)

Research on mCSCL also looks into how students develop shared meanings and co-construct knowledge in group work sustained by computer-supported technologies (Koschmann, Hall, & Miyake, 2002; Stahl, 2006). Although collaboration in small groups and the use of computers are expected to strengthen one's learning, simply arranging students together does not automatically lead to collaboration and productive learning. Students need to be able to regulate their learning as well (Barron, 2003; Chan, 2001; Kreijns, Kirschner, & Jochems, 2003).

2.2.6 mCSCL supports social interaction

As learning situations become increasingly social and interactive, mCSCL helps to optimize the amount and quality of interactions with its rich interactive channels. Interesting, collaborative learning can be mediated by different tools, take for example the discussion boards, blogs, and instant messenger. MIM applications like WhatsApp, Line and WeChat are popularly and widely used for educational purposes (Rau et al., 2008). Among all social networking services, MIM is popularly chosen to be the primary means of communication method as young people move away from in-person interaction to multi-modal such as text,

pictures and video on smartphones (Quan-Haase, 2008; Schwarz, 2011). Hrastinski, Edman, Andersson, Kawnine, and Soames (2014) cited that as a communication tool, MIM helped students to improve and achieve better when they were able to use after-school time to pose questions and receive feedback to and from their teachers. Sánchez and Olivares (2011) research showed that applying mCSCL-based teaching enhanced students' leadership, willingness and sense of responsibility to cooperate with their peers, and problem-solving ability. In studying the impact of MIM on students' attitude and achievement, Amry (2014) showed how effective the WhatsApp social networking applications was as compared with the face-to face classroom learning. Plana et al. (2013) research also revealed that students were more enthusiastic and motivated to engage in classes when "WhatsApp" was used. In promoting MIM subscriptions to information, builds social networks, supports brainstorming and fosters mutual understanding through sharing of assets like opinions (Hwang, et al., 2011). Not just in strengthening the social bondage between students and instructors as reflect in Rau et al. (2008) research, the interactivity characteristics of MIM system can increase active collaboration in learning (Bollen et al., 2004; Holley & Dobson, 2008; Markett et al., 2006).

With these findings, it further emphasizes the positive effects of the social media applications on students' motivation and engagement in classrooms as suggested by Amry (2014), Rambe and Bere (2013) and Rambe and Chipunza (2013). Bouhnik and Deshen (2014) concluded that comparing with email and SMS, it was easier to use mobile applications to form a group, manage group members, maintained relatively high privacy level, and enabled sharing and collaboration. Church and Oliveira (2013) made a comparison between MIM over SMS. They indicated that

MIM was more affordable and fast. MIM is also more interactive and social in nature. It is more suited to building a sense of community; and this leads to more frequent group chatting and working in terms of planning and task coordination. The advantages identified in various studies on MIM are illustrated in Figure 2.8.

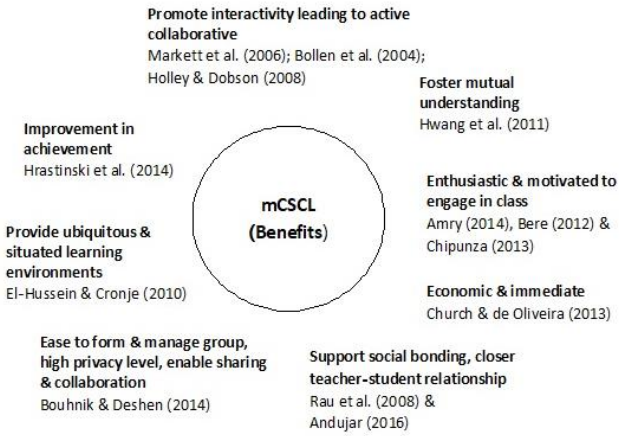


Figure 2.7: The potentials and benefits of mCSCL in education

Source: Researcher's own composition

Andujar (2016) cited that students perceived closer teacher-student relationship with using MIM. As teachers become more approachable, students feel more comfortable to ask teachers questions, and teachers also get to know students better. A teacher in Bouhnik and Deshen (2014, p. 227) research stated that, "even though I started off the year by telling them (the students) they can approach me anytime, they hesitated to call. With WhatsApp, they feel free". Although there have been empirical evidences indicating students' active participation in mobile collaborative learning activities, research on creation-oriented, design-based mobile collaborative learning are still limited and lacking. We still do not really know how different students may experience MIM and become involved using it. Thus, this is

one potentially useful research direction to examine distinct students' behavioral and performance patterns taking a MIM supported course.

2.2.7 Types of interactions in mCSCL: Metacognitive, Social and Other Interaction

Kim, Lee, and Kim (2014) identified 3 categories of interactions in mCSCL. These interactions shown in Figure 2.9 comprises of social, metacognitive and other interaction.

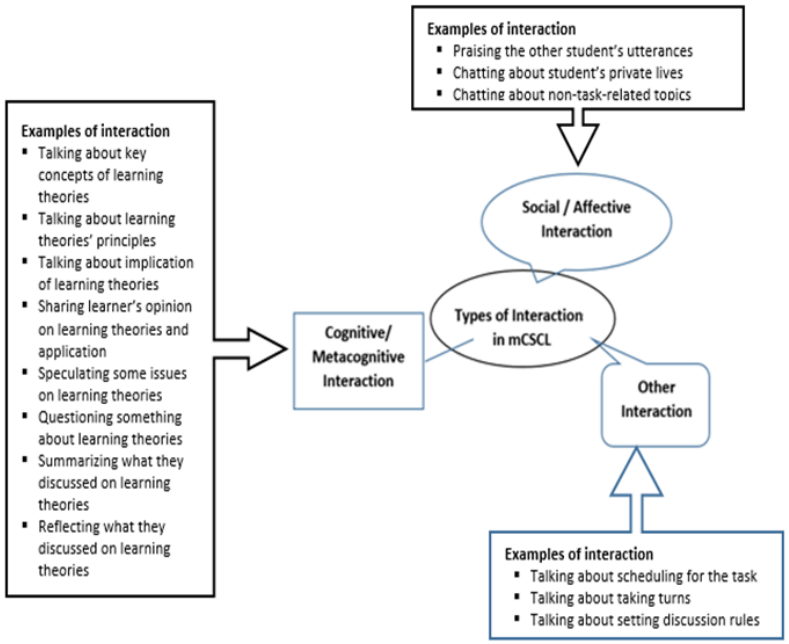


Figure 2.8: Three categories of interaction in mCSCL with examples for each category

Source: Adopted from Kim, Lee, and Kim (2014)

Metacognition is the regulation of cognition or simply known as the knowledge about knowledge as suggested by Brown (1987). It is the understanding of and reflection upon how one learns about knowledge and to apply the information to achieve a goal (Flavell, 1981). It requires higher-order self-regulated mental processes

that include planning the learning, adopting right methods to attain the needed information, to solve problem and last but not least to monitor, assess and evaluate one's own performance (Dunlosky & Thiede, 1998). The crucial learning stage also involves sharing metacognitive explanation, appraisal and opinion (Efklides, 2006). In other words, with greater awareness of one's cognitive processes, a learner can better SRL in these cognitive processes (Wenden, 1987).

Metacognitive knowledge, metacognitive regulation and metacognitive experiences are three major components of metacognition. Metacognitive knowledge refers to the degree of understanding as to the way individuals process information while completing the learning tasks (Perfect & Schwartz, 2002). As it needs learners to reflect and think about their own mental processes, metacognitive knowledge is rather stable, fallible to an extend and late developing (Brown, 1987). Metacognitive knowledge is about how students think (knowledge, beliefs, and opinions) about learning (Flavell, 1987; Vermetten, Lodewijks, & Vermunt, 1999). It is knowledge retrieved from one's recollection, beliefs and philosophies about cognition and how it works and the criteria we establish to validate the knowledge acquired. It is also about our and others' thinking (Efklides, 2006). Hence, metacognitive knowledge is about how students acquire the knowledge needed to understand the cognitive processes and strategies to control metacognitive processes and experience. Metacognitive experiences, on the other hand, refer to activities that control one's thinking and learning and involve the use of metacognitive strategies and metacognitive regulation (Brown, 1987). It takes the form of metacognitive feelings such as confidence and judgments as in judgment of learning that relates to features of cognitive processing vis-à-vis the task as the person works on the task (Efklides, 2006). Metacognitive

regulation relates to the skills used to manage one's learning and performance (Efklides, 2008). Planning, monitoring, and evaluation are some of the essential metacognitive regulations skills needed in learning. In fact, these are basic skills needed before starting on the task, during task execution, and at the end of the learning task (Brown, 1987). Metacognitive skills or use of strategies indicate control function (Brown, 1987) in managing learning. Metacognitive skills are considered as procedural knowledge. It is what the person intentionally does to control their thought (Efklides, 2006). They include activities such as monitoring the understanding of task requirements, planning the required steps to be taken to process the task, checking and regulating cognitive processing when it does not reach a desired outcome, and evaluating the processing result of the completed task (Veenman & Elshout, 1999). Table 2.2 shows the components of metacognition and their manifestations as a function of monitoring and control according to the research by Efklides (2006).

In metacognitive interaction, students engage in interactive activities that involve the controlling, assessment and revision of their team member's cognitive processes. The interaction that take place generates task related meanings. The process in developing metacognition in collaborative learning, makes students move towards independence, interdependence and self-efficacy. One model that helps to explain the metacognition interaction process is that of the Nelson and Narens (1990) Model of Metacognition.

Table 2.2: Metacognition and its manifestations (monitoring and control)

Monitoring		**Control**
Metacognitive knowledge Ideas, beliefs, 'theories' of: ▪ Person/self ▪ Task ▪ Strategies ▪ Goals ▪ Cognitive functions (e.g., memory, attention, etc.) ▪ Validity of knowledge ▪ Theory of mind	**Metacognitive experiences** Feelings of familiarity, difficulty Knowing, confidence, satisfaction Judgments/estimates ▪ Judgment of learning ▪ Source memory information ▪ Estimate of effort ▪ Estimate of time ▪ Online task-specific knowledge ▪ Task features ▪ Procedures employed	Conscious, deliberate activities and use of strategies for: ▪ Effort allocation ▪ Time allocation ▪ Orientation/monitoring of task requirements/demands ▪ Planning ▪ Check and regulation of cognitive processing ▪ Evaluation of the processing outcome

Source: Adapted from Efklides (2006)

The model as depicts in Figure 2.10, highlights two levels of cognition. First is the object level and the meta level forms the second. The object level starts with the thinking or cognitive process. The meta level concerns how a person assesses what one is thinking or 'thinking about thinking'. At this deeper level of thinking, students use metacognitive strategies to ensure that they can reach the established goals. Through monitoring, students assess themselves if they are satisfied with their understanding level. If they are not, then they need to explore further. These actions taken are known as the control processes. Students change their cognitive processes or related behaviors from the monitoring and feedback received.

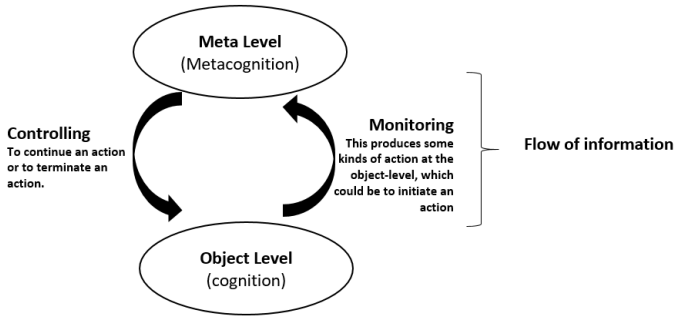


Figure 2.9: Model of Metacognition and the flow of information

Source: Adapted from Nelson & Narens (1990)

The metacognition interaction process reflects how monitoring influences the use of control for effective learning outcomes. Take for instance, in the knowledge acquisition stage of the learning process, learner's judges the level of ease in the learning and allocates certain among of effort and time to the on-going of the learning or terminate the learning base on one's judgement of knowing. This sense of judgement will deter knowledge retention. Sense of confidence will also guide the learner's self-directed search and control retrieval strategy. When the learner is confident with the findings, the next decision is to decide whether to terminate the search or not. Figure 2.11 explains the metacognition interactive process.

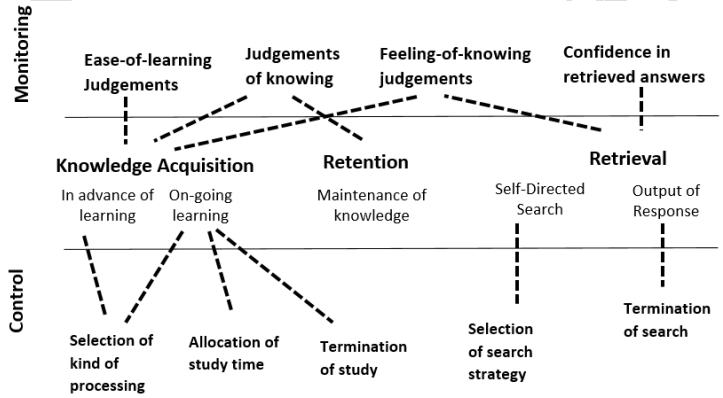


Figure 2.10: Model of Metacognition and function of monitoring and control concepts
Source: Efklides (2006)

In collaboration and joint problem solving task, it is necessary for students to have be mindful and develop on-going effort to coordinate their learning activities to attain shared knowledge (Roschelle & Teasley, 1995). To do so, individuals need metacognitions to regulate the cognitive processes (Brown, 1987; Flavell, 1979), to explicitly provide reasoning for their own thinking and to prove understanding about other students' contributions to joint problem solving. Further, to construct joint

solution, group members need to help other students to externalized knowledge by clearly explaining their thinking (Kirschner, Beers, Boshuizen, & Gijselaers, 2008). In this negotiating process, students focus on common ground (Bromme, 2000), and what is not told can be realized and assisted in the jointed knowledge construction efforts (Beers, Kirschner, Boshuizen, & Gijselaers, 2005). What this means is that participants make their own understanding explicitly visible and provide feedback for others by formulating their thoughts as written notes to the database (Lehtinen, 2003).

To understand interactive behaviors, Meyers and Feeney (2016) examined the interactive and metacognitive processes in student learning with reference to the revised Bloom's Taxonomy (Krathwohl, 2002). The categories of metacognitive behaviors include remember, understand, apply, analyze, evaluate, and create. The metacognition categories and behaviors by Meyers & Feeney (2016) is presented in Table 2.3. Metacognitive experience has a significant impact on the self-regulation of learning. There have been supporting research demonstrating that students' cognitions about learning is profoundly influenced by their study strategies. Encouraging students to adopt a self-regulated study strategy enables students to become more independent in their learning and one that enjoy higher quality learning.

Table 2.3: The metacognition categories and behaviors

Thematic Dimension	**Representative Behavior**
Remember	Ask and answer questions to recall factual statements.
Understand	Ask and answer questions to show ability to categorize, organize, paraphrase, outline, summarize, or interpret information to support one's positions
Apply	Ask and answer questions to clarify, reflect, interpret, generalize, or theorize using information to support one's position.
Analyze	Ask and answer questions to demonstrate ability to identify and describe the dynamics of processes or relationships, compare and contrast, determine relevance, draw inferences, or distill information.
Evaluate	Ask and answer questions to show ability to prioritize, assess, validate, defend, and critique information.
Create	Ask and answer questions that show ability to build new theories, adapt or combine existing methodologies, or invent new methodologies.

Source: Adapted from Meyers and Feeney (2016)

Undoubtedly, self-regulated students seek meaningful learning which eventually results in higher understanding levels (Maclellan & Soden, 2006; Vermunt & Verloop, 2000). This helps to explain why students' cognitions regarding learning is centered to the self-regulated learning model (Pintrich, 2000; Schunk, 1994; Vermunt, 1998; Winne & Hadwin, 1998; Zimmerman, Boekarts, Pintrich, & Zeidner, 2000). When students have the knowledge and skills, they can effectively and efficiently regulate their learning processes which is the ultimate goal in tertiary education (Maclellan & Soden, 2006). The social or affective interactions are non-task-related meaning unit such as personal talks or the expression of emotion. It is an expected element in the human communication and assist in collaborative learning (Shen, Wang, & Shen, 2009). Perceiving affective interaction as efforts in building a 'Learning Companion', Kort, Reilly, and Picard (2001) stated that students could have many different emotional states such as interest, curiosity and confusion. There are also social expressions such as greeting, saying appreciative words and

complimenting each other (Rourke & Anderson, 2002) when working and interacting with others. Panitz (1999) cited that an emotional environment encouraged students to take initiative in articulating their opinions of the topic while constructing a shared learning experience. Social interaction in collaborative learning invites individuals to share and elaborate different perspectives and eventually extend their thinking beyond a person's capabilities (Bereiter & Scardamalia, 2014; Chi & Wylie, 2014; Dillenbourg, 1999; Webb, 2013).

Research has also shown that socio-emotional experiences of group members and their interpretations of their interactions enhance group dynamicity and situational motivation. The meaning of social aspects as the source of both individual emotional experiences and group-shared emotional experience are especially vivid in in situations that focus on interaction and reciprocity (Linnenbrink-Garcia, Rogat, & Koskey, 2011). When working together on learning task, individuals engage in interpersonal communication and it is nature for people to have emotional reactions and expressions (Götz, Zirngibl, Pekrun, & Hall, 2003; Hareli & Weiner, 2002). These emotions whether negative and positive emotions experienced within the group can be related to other contexts and areas of lives of individual group members, their personality differences, or the dynamics and processes experienced within the collaborative group (Järvelä, Volet, & Järvenoja, 2010; Van den Bossche, Gijselaers, Segers, & Kirschner, 2006; Volet & Mansfield, 2006)

In studying emotion and motivation regulation within group, Järvenoja and Järvelä (2009) discovered that students used social reinforcement such as giving positive support to each other suggestions and task structuring, to reduce off-task behavior and carry out collaborative group work. Exploring the dynamic emotional

role in collaborative learning, Linnenbrink-Garcia et al. (2011) pinpointed that the quality of group interactions instigated group affect and the relationship between the quality of group interactions and group affect was repetitive. The third category encompasses other interactions which include talking about making schedule for the learning task or the kind of discussion rules needed (Kim et al., 2014).

2.2.8 Social interaction via MIM technology

According to Nicholson (2002), social interaction via MIM technology allowed students to interact beyond just student-student conversations to their peers and instructors as well. Students also improve their academic skills through communicating. A study conducted by Lewis and Fabos (2005) suggested that students learnt to use tone, voice, word choice, and subject matter of their messages to fit their communication needs. Nicholson (2002, p. 368) also found that students who communicated using MIM were "more likely to agree with the remarks as they feel a sense of community with classmates" than those who did not. Grinter and Palen (2002) research on MIM in teen life, showed that MIM could be perceived as a tool for "social congregation" and enhanced the sense of being a community. In their research, it was observed that participants arranged to chat with their peers on MIM after school and interactions mainly focused on socialization, event planning, and schoolwork collaboration.

2.2.9 Influences of regulating collaborative learning with mobile tools

As mentioned by Chan (2012), to collaborate successfully, students needed to regulate their own learning, and co-regulate the learning of others in the group and of the group and reciprocally. The work of other group members

influence students' self-regulation and cognition processes. As a cognitive tool, digital technology offers many potentials in facilitating structured tasks of the students (Lajoie, 2000). It helps to develop the metacognition or meta-awareness of the students' learning processes (Richardson, 2003). Many researchers such as Lai, Yang, Chen, Ho, and Chan (2007) and Wang (2003) agreed that mobile technologies supported SRL and facilitated the construction of knowledge. With their cognitive skills and technological learning tool, self-regulated learners know how to learn effectively and efficiently (Mueller, Wood, De Pasquale, & Archer, 2011). Possessing strong domain knowledge help them to develop a variety of effective strategies to maximize learning and this includes how they can monitor their own behavior and performance as well as setting learning goals. (Perry, VandeKamp, Mercer, & Nordby, 2002; Willoughby, Wood, & Khan, 1994; Willoughby, Wood, & Kraftcheck, 2003).

2.2.10 Limited studies on mCSCL

Despite the tremendous potential of mobile phones as shown in Figure 2.8, on activating engagement to create student-generated content, MIM's influence on learning is the least discussed issue of mobile devices in tertiary institutions (Rambe & Bere, 2013). The empirical effects of mCSCL have been equivocal (Sung, Yang, & Lee, 2017). Ryu and Parsons (2012) and El-Hussein and Cronje (2010) voiced the need to carry out more research on how MIM could facilitate collaborative learning as many of the research could only partially explained the positive reactions of the students. To date, there is no concrete evidence or information available in the literature concerning the overall perception of devices on learning (Montrieux, Vanderlinde, Schellens, & De Marez, 2015). Kumar, Lian, and

Vasudevan (2016) and Tindell and Bohlander (2012) also voiced the same concern of a lack of comprehensive understanding as to how MIM applications were used for teaching and learning. Several researchers have recently investigated the effectiveness of utilizing MIM such as WhatsApp in educational settings (Andújar-Vaca & Cruz-Martínez, 2017; Bansal & Joshi, 2014; Tang & Hew, 2017). Despite many research that touch on the topic of computer-based collaborative learning and some mentioning of positive findings, it is difficult to find studies that look into the specific types of interactions (Guan, Tsai, & Hwang, 2006; Hara, Bonk, & Angeli, 2000). Song (2014) added that many new tools have been introduced and integrated into the mobile devices for mCSCL purposes. These activities allow learning to be carried out across different spaces virtually, physically and socially.

Although there have been studies citing the benefits of using the mobile tools or systems for mCSCL, little has been mentioned on the actual educational practices outside the context of research investigations (Roschelle et al., 2010). Similar concern has also been raised by Al-Hunaiyyan, Bimba, Idris, and Al-Sharhan (2017) and Ebrahim, Ezzadeen, and Alhazmi (2015) stating that ML provided tremendous benefits such as mobility, instant access to information, connectivity, social interactivity, and the flexibility in time, place, pace, and space but current implementations provide little knowledge of the delivery of learning materials and the educational process. This lack of external feedback to students causes confusion about learning goals and gains (Al-Hunaiyyan et al., 2017). As shown in Figure 2.12, to disclose the “black box” of mCSCL research, current methodology approaches to mCSCL practices should explore how groups and individuals make sense of the new learning phenomena and knowledge creation process as suggested by Song (2014).

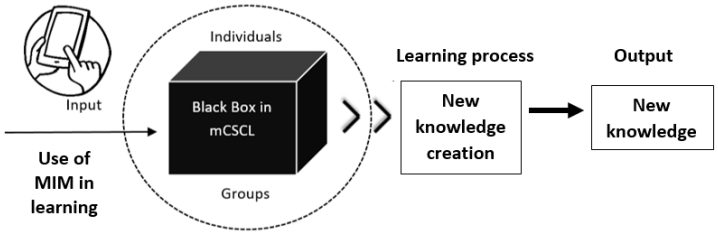


Figure 2.11: The black box of mCSCL research

Source: Adapted from Song (2014)

Communication is actually an indispensable element in learning and constructing of knowledge. Even though there is a high ownership of the devices by learners, their use for personal and student centered learning are limited (Pettit & Kukulska-Hulme, 2006). With little empirical work to translate students' learning into learning outcomes in the mCSCL environment and also evidences on how learners acquire new knowledge by contributing to each member's existing knowledge as suggested by Cui (2010), the question to ask now is how MIM is currently adopted and used in the practical sense for learning purposes. Recent studies have also revealed that technology is not well assimilated with constructivism and social constructivist leaning (Amineh & Asl, 2015). There is relatively little research about how individuals in groups participate and sustain the regulated collaborative processes (Järvelä & Hadwin, 2013). There have yet any studies on the use of mobile technology that support SRL. Only a few researchers such as Winne et al. (2006) and Järvelä, Näykki, Laru, and Luokkanen (2007) make specific efforts using SRL Theory to find ways to design technology to assist in helping students develop better learning strategies and regulate learning processes. Tabuenca, Kalz, Drachsler, and Specht (2015) studied best practices in mobile and contextualized learning with regard to study-time. A summary of the research gaps in mCSCL is presented in Figure 2.13.

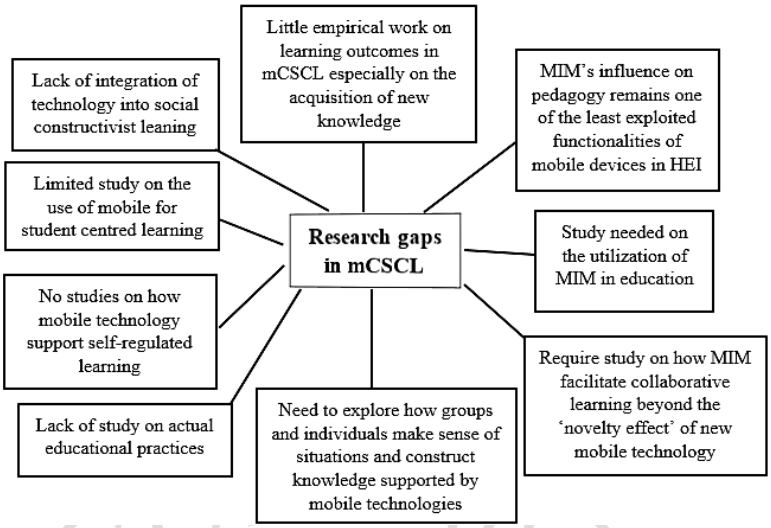


Figure 2.12: Research gaps in mCSCL

Source: Researcher's own composition

To this point, the LR on metacognition interaction process indicates that when student reached deeper level of understanding, it encourages them to adopt self-regulated and complex learning strategies. Yet, there is limited studies on the use mobile technology to support SRL and particularly how groups (and individuals in groups) support sustainable regulate collaborative processes. The next section of the literature focuses on the knowledge consideration of ML. To study the mCSCL behaviors, it is essential to understand the boundary mechanism of ML. Boundary Crossing Theory helps to realize how the crossing of context could facilitate learning. The four mechanisms namely identification, coordination, reflection and transformation are discussed.

2.3 Knowledge Consideration: Boundary mechanism in ML

Learning is an interplay between personal experience and social competence (Wenger, 2000). It is a dynamic two-way relationship between people

and the social learning systems in which they participate. Learning involves boundaries but education research mainly involves studying learning within boundaries of practices and focusing one domain or group of expertise (Akkerman & Bakker, 2011). Individuals usually act within the boundaries of an activity system that embeds a set of sociocultural norms, practices and values that impact a person's interpretation of meanings, interactions and relationships. Sociocultural differences can either be potential barriers or potential resources for establishing communication, collaboration and learning when two or more activity systems meet (Akkerman & Bakker, 2011). Boundaries are valuable to learning systems because connected communities can offer learning opportunities (Wenger, 2000, p. 233). CoPs is the foundation of a social learning system because it comprises many social 'containers' of the competences that build up the system (Wenger, 2000, p. 225). CoPs signifies the presence of boundary and they can trigger boundary crossing to allow interaction and action (Akkerman & Bakker, 2011) and finding ways to ensure continuity when crossing sites (Akkerman, Bruining, & van den Eijnden, 2012b).

Boundary crossing occurs in situations when individuals enter unfamiliar territory where they are considered new or less qualified (Akkerman & Bakker, 2011). In a community, learning usually occurs because of the competence and experience that exist in the community. At the boundaries, competence and experience tend to extend in a different direction as boundary interaction allows individuals to experience or expose to unfamiliar competence (Wenger, 2000). Therefore, it involves going into foreign territories and requires cognitive retooling (Tsui & Law, 2007, p. 1290). New components are presented from one community of practice to another by the people who cross the boundary. The new components are often

referred to as “boundary objects” (Star & Griesemer, 1989), and these are often associated with the creation of new tools which is also referred to as new knowledge.

Learning as a production of practice creates boundaries because the sharing of learning usually differentiates those who are and those who are not from the learning processes (Wenger, 2010). Hence, boundaries are potential means for learning, as they can prompt individuals, groups, or larger systems to cross boundaries. This boundary crossing movement activates changes in the community and prevents the practices in the community to becoming too static (Wenger, 1998b). Boundaries of practice are not geographical confined (Wenger, 2010). They foster interlinkage between formal knowledge in the academy and informal work process knowledge in the practical world (Akkerman & Bruining, 2016). Boundaries become more explicit with increasing specialization and this is a way people connect and activate themselves across social and cultural practices to avoid division (Hermans & Hermans-Konopka, 2010). Researchers such as Engeström (2001), Roth and Lee (2007) indicated that the collaboration of various activity systems could enhance sense making and transform intersecting practices. The integration of activity systems between university and workplace as shown in Figure 2.14 indicates the potential sharing of knowledge via interaction from the domains of school and workplace.

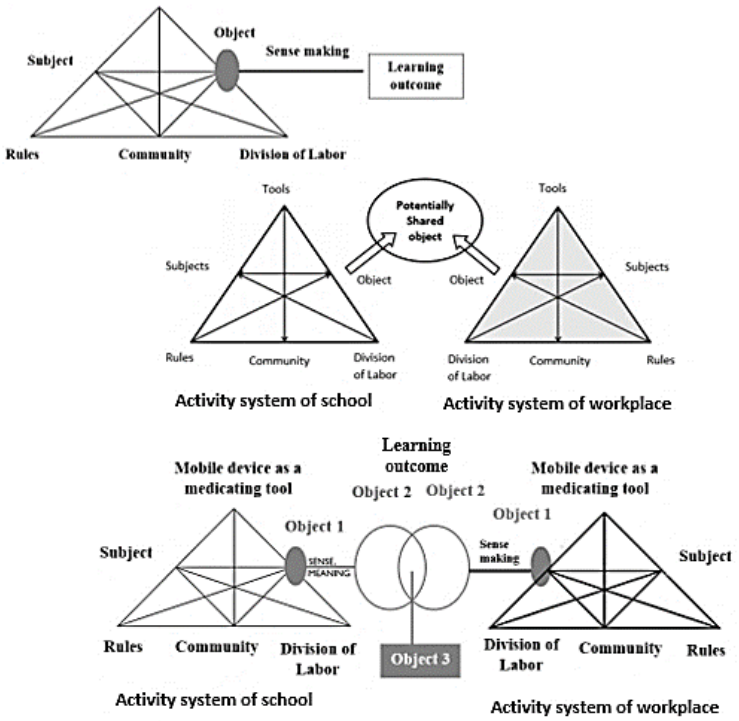


Figure 2.13: Integration of activity systems between university and workplace
Source: Adapted from Engeström (1987, p.78, 2001); Konkola, Tuomi-Gröhn, Lambert, and Ludvigsen (2007, p. 216)

Mobile phone is a boundary crossing tool (Pimmer, 2016). Mobile and wireless technologies enable out-of-class learning to be connected directly with the practical world. The term mobility in the boundary crossing context, does not simply means the movement of the learner but also the mobility of the content. Sharples et al. (2007, p. 4) regarded ML as "the processes of coming to know across multiple contexts among people and personal interactive technologies". Schuck, Kearney, & Burden (2017) using the metaphor of the “Third Space” to envision learning to be conceptualized in an expanded variety of places, times and ways. For students to advance their learning, they need to move beyond their boundaries between one’s subject domain and the realm of pedagogical theories and knowledge (Akkerman &

Bakker, 2011). This context-crossing has also been mentioned by Wali et al. (2008). Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, and Vavoula (2009) defined context-crossing as “the change of physical or social setting and the mobility of crossing physical” and social spaces as “the central to ML”. Attwell, Cook, and Ravenscroft (2009) further suggested that the use of the mobile technology allowed the development of boundary objects to transcend the physical and virtual worlds. Nevertheless, to collaborate beyond one’s own profession and institution is challenging (Akkerman & Bruining, 2016).

2.3.1 Four mechanisms of boundary crossing

Four mechanisms namely identification, coordination, reflection and transformation constitute the learning potential in boundary crossing (Akkerman and Bakker, 2011). Figure 2.15 highlights the boundary mechanism in ML and Table 2.4 shows a summary table of the boundary mechanism.

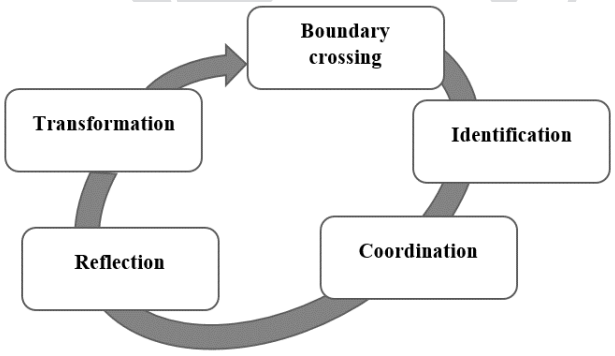


Figure 2.14: The 4-boundary mechanism in mobile learning
Source: Adopted from Akkerman and Bakker (2011)

Table 2.4: Boundary mechanism in mobile learning

Boundary mechanism in ML	
Identification	Identification of the intersecting practices
Coordination	Coordination of both practices through establishing routinized exchanges to facilitate transitions
Reflection	Lead to perspective-making and perspective taking
Transformation	Provoke changes in practices or creation of a new in-between practice

Source: Adopted from Akkerman and Bakker (2011)

Identity is an important element in the social learning systems (Akkerman and Bakker, 2011). Identification is a way of knowing base on one's competence and experience. While we interact, we open up our identities to other ways of being in the world (p, 252). As members of a community or different communities, boundaries help to develop identities and how we deal with these boundaries (Wenger, 2010). Hence, identification arises when a person is exposed to a different domain of knowledge and practice and question the main identity of each of the crossing sites and how these practices are linked to each other. Some of the basic questions by students and their partners include who are you, what do you do, and what will you bring to the partnership? In this phase, conversation focuses on the identification of the governance arrangements, roles and duties, and aims of each partner (Akkerman & Bakker, 2011). According to Pillay, Flynn, Watters, and Hoff (2017), learning about the particular activities in both school and practical field is an important way to apprehend learning at the micro and macro levels. Othering and legitimating coexistence are two processes that occur in the dialogical process of identification (Akkerman & Bakker, 2011). Othering emerges when one compares the practices in one's domain with that of another and justifies the differences in terms of "we vs. you" or "this vs. that". Differences between the two cultures and their complementary

features, are expressed to rationalize their coexistence. When the identification process reaches the legitimate coexistence state, the learner will be able to reconstruct one's own identity by considering other's experiences and this help to foster one's own practice based on the pedagogical theories and on the material of original domain (Akkerman & Bakker, 2011).

When people feel uncertain of their own knowledge domain due to similarities or overlap between practices of other domain, individuals will enact on their identification mechanisms (Akkerman & Bruining, 2016) and will engage in the reconstructing of their knowledge creation between boundaries to renew identities as knowledge builders (Yeo, 2014). Figure 2.16 illustrates the process of identification and how the continuity of the two processes help in the adaptation and development of new knowledge.

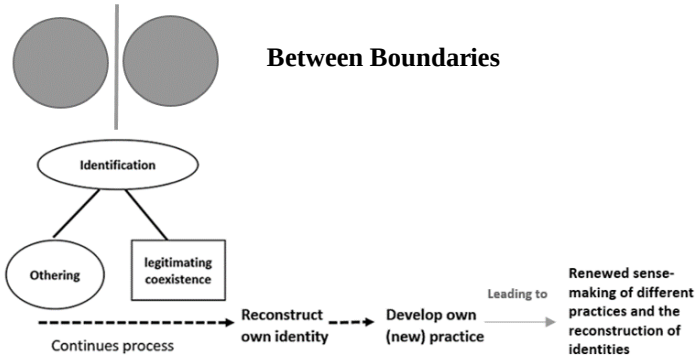


Figure 2.15: Dialogical process of identification
Source: Adapted from Akkerman and Bakker (2011)

For this study, identification takes place when students realize for continuous learning, they need to understand practical practices (which may not be covered in their classroom learning or not easily understood or comprehended) outside their own domain by identifying the appropriate person in the professional field. With mobile

interaction, one can experience different practices without having to physically cross the boundaries to encounter and redefined the practices. That is to say, students can compare what they have learnt in class and out-of-class (the othering process taking place) and complement their new learning into their domain to allow co-existence. Therefore, with mobile interaction, students are able to make sense of their learning by enhancing their identities as learners.

Coordination is the next boundary crossing procedure theorized by Akkerman & Bakker (2011). Erstad et al. (2016) suggested that coordination involved some forms of networking and communication between various practices or viewpoints. Several studies have shown that learning that is boundary-based needs careful synchronization of communication and interpretation between domains (Akkerman & Bakker, 2011). According to Landa (2007), to share multiple perspectives, communication was a requisite for it allowed smooth transition of diverse practices to establish new exchanges and routines that aligned activities (Akkerman, Bruining, & van den Eijnden, 2012a). In this study, the researcher uses the text-and-tell mobile platform for students to share new information with the class. The chance to interact to learn new things and how new questions are generated highlight the involvement of students in out-of-class boundary crossing learning activities.

Erstad, Kløvstad, Kristiansen, and Søby (2005) also observed that by extending the learning environments through boundary-crossing activities would indicate the emergent of shared aims for collaboration between the students and their boundary-partners. When boundary-crossing learning becomes a way of learning and practice, students will acquire the skills to interact in cross-boundary learning context.

The cooperation between the two parties will become more mutual with the out-of-school boundary-partners eventually taking a greater role in the collaboration efforts. The portability and multi-media capturing features of mobile technology as cited by Pimmer (2016), permits learning to become space independent sharing and coordinated work can be easily be distributed in socio-cultural, disciplinary and physical settings. Figure 2.17 indicates how coordination influences exchanges and transition across boundaries between learners and CoP in learning activities.

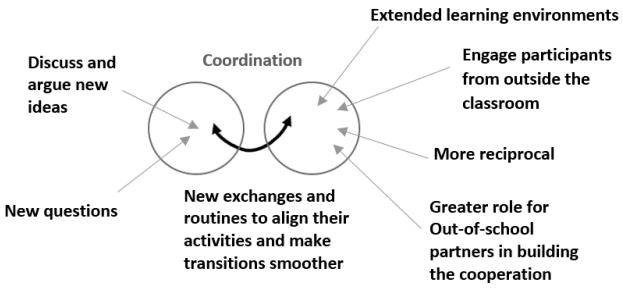


Figure 2.16: Influence of co-ordination on exchanges and transition across boundaries
Source: Adapted from Akkerman and Bakker (2011)

In this study, coordination arises when students and their external learning partners find effective ways to enable cooperation. This bridges work and schooling. Coordination involves competency profiles, portfolios and assessments. Students prior to the mobile interaction, discuss and make argument among themselves (teachers and peers) on the new ideas. When interaction with external learning partners, exchange of knowledge and new understanding occurs. In doing so, the role of informal learning intensifies and so is the co-operation between school and practitioners.

The third boundary crossing mechanism is reflection. It encompasses learning and respecting the viewpoint of the partner from the feedback received. Reflection is regarded as the “capacity for higher-order thinking” enabling one to

make connection to what they are thinking (Denton, 2011, p. 838). Reflection allows the mutual definition of different standpoints that cross cultural boundary brings, and readiness to accept different opinions (Akkerman et al., 2012a). In reflection, differences and resemblances are being studied and defined. Intersecting practices make practitioners value and take other's perspectives. Thus, reflection empowers an individual to see differences in practices from others' standpoints. Reflection also takes into consideration the cultural perspectives of others such as behavioral standards, industry codes of conduct and school behavioral policies (Pillay et al., 2017). There are two perspectives to reflection: making and taking perspectives that help to build and comprehend new perspectives (Erstad et al., 2005). These two elements have different focuses. Identification process examines the differences in terms of sociocultural factors while reflection aims to provide wider points-of-view by encouraging new boundary crossing and encountering (Erstad et al., 2005).

In their research, Erstad et al. (2005) observed that the central factors relating to reflection were learning for life and learning in community. The researchers added that the benefits of boundary-crossing activities increased the richness of the teaching situation by widening the learning environments to make learning more real-world like. Students are able to meet people of different backgrounds, exposing themselves to intersecting cultures and creating genuine situations to learn and develop the skills and knowledge needed. The extended environment means that students can shift away from traditional learning space to an out-of-school contact for practical encounter.

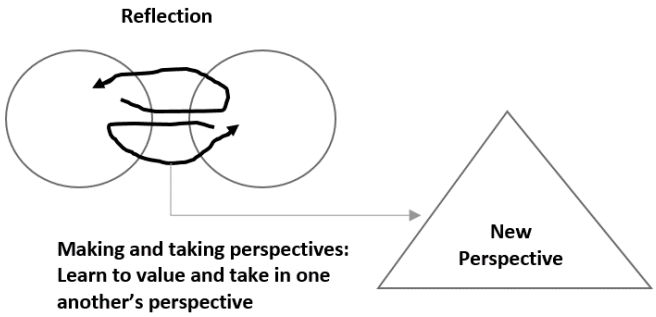


Figure 2.17: The reflection mechanism for new perspective

Source: Adapted from Akkerman and Bakker (2011)

In this study, students reflect on their new learning when they make and take perspectives based on their understanding provided by the external learning partners. Students observe the differences and similarities between academic learning and actual practices. In doing so, they are influenced by the values of the practitioners and students begin to take a non-school perspective. In other words, the reflection mechanism enables students to comprehend and adopt new perspectives and learning practices. The reflective mechanism provides wider viewpoints with the new boundary encounters and crossings.

Boundary crossing can lead to transformation. Assimilated into hybridized activities within intersecting cultures, learners often encounter problems and rise questions. These problems are seen as shared problem in the boundary context of space (Erstad et al., 2005). During the transformational process, change can be noted in two ways. It can be in the form of changes in the current practices or new in-between practices. The transformation processes may start with an initial fight with a problem. This problem is then acknowledged as a common problem. Through the hybridization of activities, new ideas are crystallized. This is where new plans are

developed with new procedures discussed and new tools adopted to ensure easy transformation. Transformation also implies some maintenance of the original special practices and perspectives and incorporates the supplementary values from the joint work (Akkerman & Bruining, 2016). For this study, transformation as depicts in Figure 2.19, comes into effect when students modify their learning practices to incorporate the new simulated learning practices. The crossing of boundary signifies an innovative change from previous learning mechanisms and transformation takes place with the adoption of the renewed practices. Besides the change process, maintaining distinctive intersecting practices, and continuity in collaboration at the boundary are part of the typical processes in transformation.

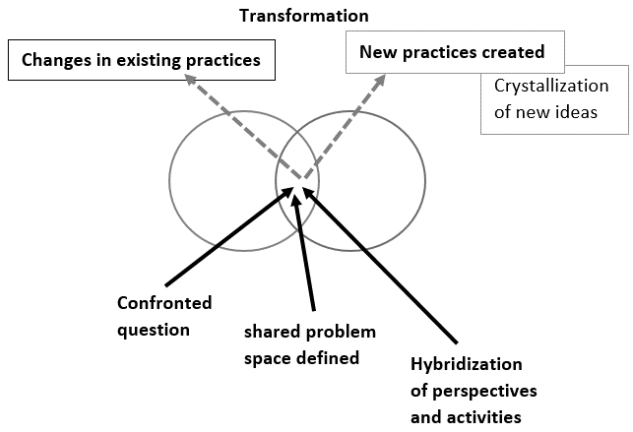


Figure 2.18: The transformational process in boundary crossing

Source: Adapted from Akkerman and Bakker (2011)

By recognizing the importance of students' learning across in-class (formal) and out-of-class (informal) contexts, this research hopes to narrow the gap of traditional educational practices of schooling and changing requirements that current knowledge societies set on learning and education. Now that we have understood the

boundary crossing mechanism and how it works, the next question to explore is how these changes affect students' learning and how they SRL within and across contexts.

2.3.2 Regulated Learning in mCSCL

No doubt students can learn on their own with the help with educational technology. However, at tertiary level, students are often encouraged to work in groups on joint problems solving and to work collaboratively on the assigned shared task. In such learning conditions, students are required to regulate their own learning, co-regulate with others and shared regulated as a group and reciprocally. In this sense, the work of group members impacts students' own regulation and cognition process in learning. With the adoption of mobiles as a learning tool among university students, the computer-supported collaborative learning (CSCL) framework for self-regulation needs to be extended to explore the potential of mobile-supported environments in enhancing regulation for mCSCL.

To provide a mechanism to structure collaboration in a mobile environment, SRL Theory can help to regulate, monitor, and control the various aspects that affect the learning process and evaluates learner's learning behaviors. Zumbrunn, Tadlock, and Roberts (2011) and Zimmerman and Schunk (2008) suggested that SRL could be interpreted conceptually in terms of learners' cognitive, metacognitive, behavioral, emotional and social involvement. To effectively navigate learning experiences, SRL is an important indicator of student academic motivation and achievement (Zumbrunn et al., 2011). Traditionally, self-regulation research in learning focuses on the individual stance but there is now a growing interest looking into the mental activities in SRL at the social level (McCaslin, 2004). Zumbrunn et al. (2011) indicated that the teaching/learning process involved not just cognitive components, but also social

components. This shift in research focus is depicted in Figure 2.20. With increasing use of technology, researchers start to examine how learning technologies can support or promote student SRL (Dabbagh & Kitsantas, 2012; Hwang & Chang, 2011; Kitsantas & Dabbagh, 2011; Nicol, 2009; Sheppard, 2011)

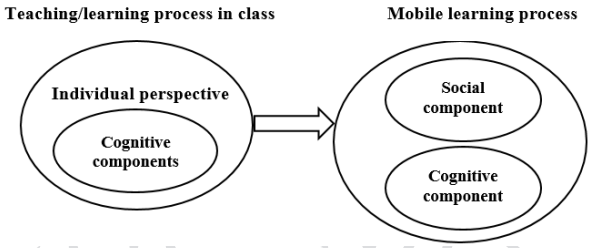


Figure 2.19: Self-regulation from a social cognitive perspective

Source: Researcher's own composition

From the social cognitive perspective, SRL is the level of pro-activeness and responsibility on the part of the students towards their learning process (Zimmerman, 2008). As part of the theoretical framework, this research uses the SSRL Theory to study how technology assists students to improve learning tactics and control their learning process on individuals and social levels. Regulated learning is one of the essential skill needed for student to collaborate in learning. Performing group task together signifies the co-construction of shared task, goals, and approaches. It also denotes the regulation of learning based on collective metacognitive monitoring and control of cognition, motivation and behavior (Hadwin, Järvelä, & Miller, 2011). Without this sense of shared task and goals, collaborative work may be disrupted and students are likely to experience dissatisfactory learning experiences and unable to enjoy their learning (Hadwin et al., 2011). In collaborative learning settings, students' active engagement in collaborative interactions is perceived as supporting group's directed engagement in the shared task space (Roschelle & Teasley, 1995). It is not

easy to achieve good coordination as individual members in the group regulate cognitively and emotionally in the process and this is a challenge in socialized interactive context (Järvelä et al., 2010). To understand the influences of regulatory processes on the success of collaboration, Järvelä and Hadwin (2013) highlight four assumptions of regulating learning. The assumptions are as follow:

1. Regulated learning is mostly out of one's intentional and is goal oriented.
2. It is metacognitive whereby the processes of planning, monitoring, and controlling form the center for the theories of regulation
3. Learning involves regulating behavior, cognition, and/or motivation/ emotions.
4. Regulated learning is social and learners need to know about the social (Schunk & Zimmerman, 1997; Volet et al., 2009).

In mCSCL learning approach, group members work together to overcome problems and co-construct knowledge through talking to others (van der Linden, Erkens, Schmidt, & Renshaw, 2000). To solve problems, students need to monitor, control, and regulate their learning activities to improve performance (de Jong, Kollöffel, van der Meijden, Kleine Staarman, & Janssen, 2005). Theory and research about regulated learning must explicitly attend to monitoring and control processes such as activating self/group, task, and strategy knowledge, planning, monitoring, evaluating, or strategically adapting engagement. If metacognitive processes are not measured/observed or systematically analyzed, the research is not about regulation of learning (Järvelä & Hadwin, 2013). Worth noting is that technology is capable of giving new assessment, grading, reporting, and instant feedback for both instructors

and students (Olufisoye & Ola, 2013). From this viewpoint, the teacher's role is seen as a stimulator for competent, efficient and encourage the use of technology and other resources to enhance the learning process. There are at least three types of regulated learning when individuals work collaboratively (Winne, Hadwin, & Perry, 2013; Järvelä & Hadwin, 2013). Järvelä, Volet, and Järvenoja (2005) distinguish SRL from three prospects. These perspectives are as follow:

a) The individual as a regulator of a behavior. In this perspective, SRL is referred to the process of becoming a tactical learner by regulating their reasoning, drive and behavior to improve learning (Schunk & Zimmerman, 1994).

b) SRL as a co-regulation. Influenced by Socio-Cultural Theory, co-regulation stresses on the steady adoption of sharing common problems and tasks through interpersonal communication (McCaslin & Hickey, 2001; Schunk & Zimmerman, 1994).

c) Shared regulation as collective processes. The collective regulation refers to the co-establishment of common understanding (Roschelle & Teasley, 1995) where groups create shared awareness of aims, advancement, and tasks toward the collective regulatory processes.

Järvelä and Hadwin (2013) linked these perspectives of SRL to successful collaboration requirement stating that individual member was in charge for regulating one's learning. Each member in terms supports fellow members to effectively regulate their learning thus signally a co-effort in the regulation of learning. Successively, the group gets together to an interpersonal level to collectively regulate learning processes in a coordinated and constructive manner making shared-

regulation of learning feasible. These three levels and dimensions of regulation are highlighted in Figure 2.21.

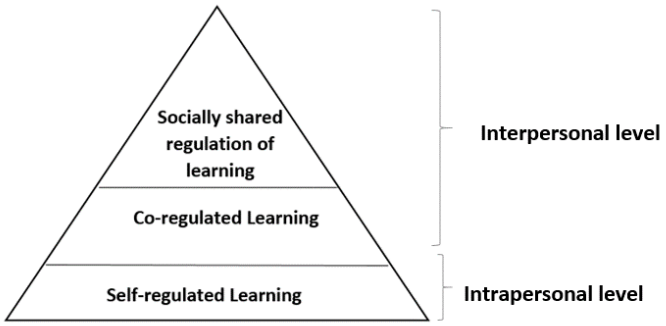


Figure 2.20: Three levels and dimensions of regulation in learning

Source: Adapted from Jarvela and Hadwin (2013); Winne, et al. (2013)

SRL Theory is concerned about the development and usage of learning skills of the students for effective learning (Boekaerts, Pintrich, & Zeidner, 2005). Pintrich (2000, p. 453) cited self-regulated learners who took active roles in selecting and setting goals which enabled them to develop strategies to manage and evaluate the learning process and performance. The appropriate use of learning strategies by learners is dependent on the students' past learning experiences and therefore, it is adaptive (Hadwin, 2013). In addition, SRL is guided by environmental circumstances (Schunk & Zimmerman, 2012) whereby teamwork requires each group member to self-regulate one's cognitive processes, actions and beliefs (Hadwin, et al. 2013).

Bandura (2001) and Martin (2004), cited that proactive learners stimulated by own's impulses and external environment, self-organized and self-regulated their learning. Taking this stand, it assumes that engagement in learning is mediated by learners' personal factors such as prior knowledge, goals, and self-perception of the task. The key papers on SRL are presented in Appendix 1. Co-regulated learning, on

the other hand, derives from Vygotsky (1962) principle of internalization. Vygotsky suggested that one's thought was revealed within socially mediated activities. The reason of inquiry is to observe how learner internalized the learning processes in social activities (Palincsar & Herrenkohl, 1999). By conversing with more knowledgeable others (MKO), individuals are exposed to a variety of social tools such as cultural objects, language, and social institutions to internalize the information received (Vygotsky, 1962). Earlier definition of co-regulation emphasizes the interaction of two or more peers in the coordinated learning processes (McCaslin & Hickey, 2001; Yowell & Smylie, 1999). But Volet et al. (2009) further explained that co-regulation as multiple self-regulating agents worked together socially to help each other regulates learning. This indicates the social and depth of the learning process. Giving a balance view, Hadwin, Nesbit, Jamieson-Noel, Code, and Winne (2007) stated that to co-regulation of collaborative learning happened when individuals' regulatory activities were supported, directed, or limited by and with others in the group The expression 'co-regulation of learning' is also referred to the common influence of student's own self-regulation and the regulation from other sources such as teachers, peers, curriculum materials and assessment instruments on student learning (Allal, 2011). Hence, to accomplish a mutual understanding and collective goals, learners engage in dynamic interaction via co-regulation in collaborative learning. High-level co-regulation is normally led by a question or an explanation (Volet et al., 2009). To analyze co-regulation behaviors, Zheng, Kumar, & Kinshuk (2014) suggest six dimensions to examine co-regulation behaviors. These dimensions are as presented on Table 2.5.

Co-regulation is a necessary step to ensure productive collaborative learning (Winne, Hadwin, & Perry, 2012). However, research on co-regulation has received little attention in the CSCL field (Dillenbourg et al. 2009). Although there has been many studies done in the area of a body of literature on regulated learning in recent years (Allal, 2011; Hadwin et al., 2011; Volet & Vauras, 2013), not much is known specifically on the behavioral patterns of co-regulation. Zheng and Yu (2016) analyze undergraduate students' co-regulation behaviors and recommend that future research was needed to analyze learners' cognition, emotion, social interactions, in conjunction with knowledge construction combined with their behavioral patterns.

Table 2.5: Six dimensions to analyze co-regulation in mCSCL

Dimension	**Category**
Goal orientation	I. Establishing task demands and setting goals
Making Plans	I. Making plans to reach the goal II. Negotiating the division of labor
Enacting Strategies	I. Advancing and explaining solutions II. Coordinating conflicts
Monitoring and controlling	I. Monitoring or controlling group progress II. Claiming (partial) understanding or comprehension failure detecting errors or checking plausibility
Evaluating and reflecting	I. Evaluating current solutions II. Reflecting on the group's goals and progress
Adapting metacognition	I. Making adaptions to goals, plans, or strategies

Source: Adapted from Zheng et al. (2014)

The researcher agrees on this research hollow and examines the influence of co-regulation on new knowledge formation to narrow the gap. This understanding on how students co-create with their mobiles is significant for current and future learning as the understand can contribute to the teaching and learning designs for effective learning. Key research papers on co-regulation are presented in Appendix 2.

Interest in shared regulatory group processes has emerged with changes in the current pedagogical practices. Panadero and Järvelä (2015) research showed sufficient empirical evidence to support the presence of socially shared regulated learning (SSRL) phenomenon. SSRL is a 'new and growing field' in the framework of SRL theory (Panadero & Järvelä, 2015, p. 2). SSRL occurs when groups regulate together collectively (Panadero & Järvelä, 2015). Groups deliberately and strategically making adaptation during phases of collaboration in terms of negotiating common task perceptions, aims, plans, and methods (Hadwin et al., 2011). According to Rogat and Linnenbrink-Garcia (2011), SSRL maintained optimistic socio-emotional communication during teamwork by listening and taking each other's opinions into consideration. As it involves multiple individual perspectives, working together in SSRL processes, refinement of cognitive, motivational and emotional conditions are needed to derive at a shared outcome (Hadwin et al., 2011; Panadero & Järvelä, 2015).

Hadwin et al. (2011) conceptualized SSRL in four loose sequences that were linked to the feedback circles. In the first feedback loop, groups negotiate and create shared task based on internal and external representations of the existing assignment (Winne & Hadwin, 1998). In the second loop, groups begin to identify and establish shared task aims and plan tactics to deal with the work together. By the third loop, groups manage their teamwork tactically and assess progresses. The group can make alterations to their task after monitoring their activities. The group can adjust their thoughts of the task, goals, plans, or tactics to lift their collective activity towards the shared learning goal. Basically, when groups participate in SSRL, they broaden their regulatory activity from the .'I' to the 'we' level suggesting their support in the

collective activity (Hadwin & Oshige, 2011). This ‘transfer in sharing’ during SSRL is vital for successful collaborative learning as cited by Malmberg, Järvelä, Järvenoja, and Panadero (2015, p. 4). However, learners have to observe how relevant is the information and how it can be integrated with previous knowledge of task, self and social context. Learners often are unable to recognize these challenges in developing strategies for SSRL. Hence, it is important that students see the need to construct adaptive regulation strategies when working together (Järvelä, Järvenoja, Malmberg, & Hadwin, 2013).

There are also some evidences that the SSRL yields good performance than co-regulation or self-regulation (Volet, Vauras, & Salonen, 2009), but again evidences are needed to affirm these findings. With respect to the use of mobile phone, insights into the interactive pattern in co-regulation will provide greater understanding and guidance for instructors understanding of how various co-regulation behaviors in online chat contribute to excellence in learning. The key papers on SSRL are presented on Appendix 3.

2.3.2.1 Models of SRL

Despite decades of research in developing theories and models for SRL, there is yet any specific model that can be applied to inspect the process of regulated learning (Malmberg, 2014). Till now, several models of SRL have been presented. Three models, namely the Information Processing Model (Winne & Hadwin, 1998), General Model (Pintrich, 2000), and the Cyclical Model (Zimmerman et al., 2000) are among the commonly used models in SRL research (Malmberg, 2014). Among these models, the Information Processing Model by Winne and Hadwin (1998) is more comprehensive in the explanation of the

metacognitive and cognitive processes in self-regulated learning. The feedback loops are much more complex and support the building blocks of self-regulated learning (Zimmerman, 1990). Learning as a form of information processing can be classified into sequences within certain chronologically-ordered procedures that can be distinguished and described. To meet the research objective, the Information Processing Model is adopted. Analyzing the flow in the interaction using the model enables the observation of the metacognitive skills development.

Metacognition is perceived as a form of self-regulation in terms of ability of an individual to control one's cognitive processes. It has been linked to intelligence (Borkowski, Carr, & Pressley, 1987; Sternberg, 1984, 1986). The metacognitive strategies of SRL are higher-order skills fundamental to the understanding of how mobile collaboration help students to co-create new knowledge. Knowledge is regard as metacognitive if it is vigorously used in a deliberate manner to ensure that a goal is achieved. As cited by (Corno, 1986, 1989), self-regulated learners not only organized their own learning process but continually evaluated their performances. These elements in learning are known as 'metacognition' (Ghatala, 1986; Pressley, Borkowski, & Schneider, 1987) and motivate students to be knowledgeable in the process of learning (Zimmerman, 1990).

2.3.2.2 The Information Processing model of SRL

Sha, Looi, Chen, and Zhang (2012) mentioned that knowledge and skills of SRL were the antecedent to ML, and one of the anticipated outcomes of ML was the design and application of ML systems that fitted the principles of SRL. Mobiles devices can be used as cognitive tools (Chen, Tan,

Looi, Zhang, & Seow, 2008) and metacognitive tools for learners (Sha et al., 2012). Järvelä and Hadwin (2013) used this 4-phase model namely task analysis, goal setting and planning, enactment (task strategies) and adaptation to strategically explained the cognitive architecture underlying the theory of SRL. Each phase comprises of the similar general cognitive design of conditions, operations, products, evaluations and standards or COPES. Students will go through this structure by finishing each phase and then moving on to the next. Figure 2.22 illustrates the cognitive architecture underlying the 4-phase model of SRL.

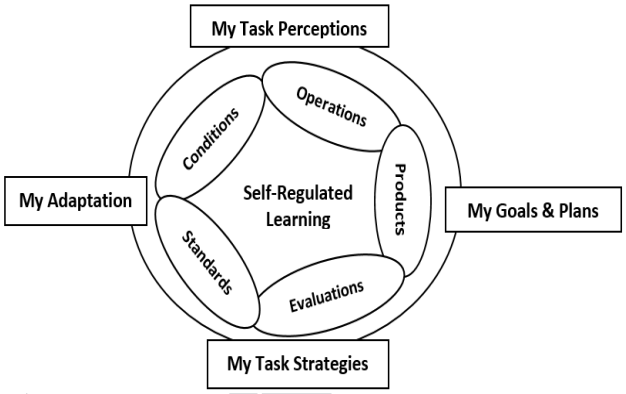


Figure 2.21: The Cognitive architecture underlying the four-phase model of SRL

Source: Adapted from Winne and Hadwin (1998; 2008); Pieschl, Bromme, Stahl (2008)

SRL alone is not strong enough to explain the collaborative learning process. The stages of learning should also be taken into consideration for successful collaboration. Integrating Winne and Hadwin (1998) studying model with SRL reinforced the regulated learning model. Winne and Hadwin (1998) model of studying has four basic stages in which learners engage in. The four phases within the learning tasks are as follows:

a) Task analysis: This is when learners develop a work plan and generate a view of what the task is about and the limitations face as well as the resources needed for the purpose of the task.

b) Goal setting and planning: Learners create goals that relate to their task model and then select cognitive operations. A designed plan needs to address the learning strategies to forecast how goals can be attained.

c) In the Enactment stage, learners apply strategies to the task and provide updates to learning and views.

d) Adaption: With the received information, learners will start the evaluation with monitoring and adapt the learning in the three previous phases if progress deviates from standards stated objectives. Based on the overall experiences of this studying event, the student will make changes to the cognitive structure that will affect future studying tasks.

The external and internal contextual conditions can affect the depth of the understanding of the task. These conditions can influence how the students see the task and themselves in the current learning situation (Hadwin, 2013). External conditions have an impact on the learning process and notify the operations and standards that learners seek to meet when performing the task (Winne & Hadwin, 1998; 2008). Factors that relate to the external conditions include the complexity of the given work, the social and contextual features, amount of resources available to execute the work, how much time is given and if the environment allows the work to be performed. For internal cognitive conditions, it involves the students' prior knowledge, knowledge of the strategies to be adopted to execute the work, as well as the quality of judgment students demonstrate

To accomplish the task, it depends on the students' perception of the context , the will to understand the task and the knowledge to select better tactics needed. As shown in Figure 2.23 the internal and external conditions students encounter while in task.

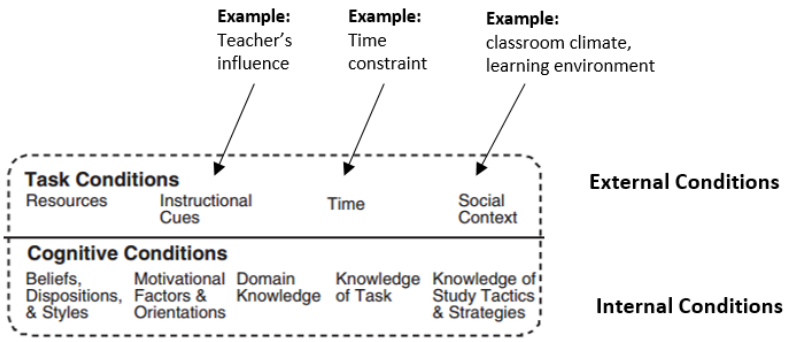


Figure 2.22: External and internal conditions in determining perception of the task
Source: Adapted from Winne's and Hadwin (1998)

How precise students have understood a task really depends on their ability to know and read task cues (Pieschl, 2009) and this is especially so when they receive minimal guidance from their instructors. As such, students need to draw connections to what they know and how similar the new task assigned and activities are related to the earlier completed work (Kirschner, Sweller, & Clark, 2006; Winne & Hadwin, 1998). With less explicit or implicit information provided, students may face hindrance in task understanding which may negatively affect the overall learning process (Miller & Hadwin, 2012). Generally, when students give priority and time to analyze their task, they will experience positive learning outcomes (Bannert & Reimann, 2012). Perry (1998) discovered that in classrooms where students received support for self-regulation, they would not feel shy but became engaged and more willing to take challenges with better planning and apply a selection of learning

approaches. Operations relates to "what students do to work on tasks" (Winne & Hadwin, 2008, p. 302). Operations are the real information management processes that happen in learning which include searching, monitoring, assembling, rehearsing, and translating. These processes are what Winne (2001) referred to as SMART. The SMART practice is more cognitive than metacognitive. In describing a task, learners search for appropriate information to a task, monitor this process, collect needed information to form their representation of a task, go over the defined task if required, and translate and interpret the task.

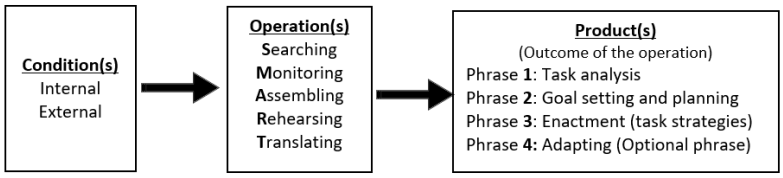


Figure 2.23: Operational process learners engaged in to reach an outcome

Source: Adapted from Winne and Hadwin (1998)

Products are results generated out of the operations. Learners' interpretation of a task is the product of the first phase in defining the job. The products that tactics create are cognitive. From operations, products are established within each phase. According to Greene and Azevedo (2007), these products would go through several phases. These phrases are as follow:

Phase 1: Set to define the task

Phase 2: Establish goals and develop plan to execute the task

Phase 3: Make the effort to learn or Enactment

Phase 4: Adaptation or recycling through the current or previous phases to bring the product up to specification

Evaluations concern the internal or external feedback of the products that students generated as they proceed to each phase. When a learner meta-cognitively monitors cognitive products- that is, when thought is self-observed - internal feedback is generated (Butler & Winne, 1995). External feedback may also be generated as the learner interacts with the material environment, for example, when a learner's contribution to a shared activity invites peers' evaluative feedback or when unexpected results are returned from a search on the internet. Figure 2.25, shows the internal and external feedbacks for evaluations.

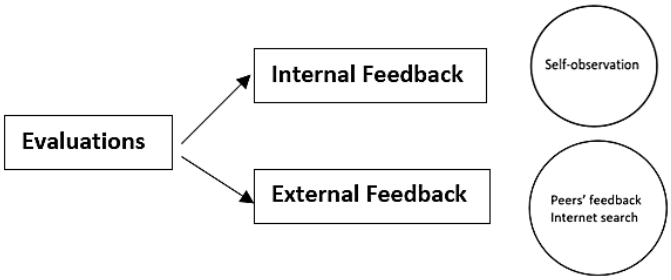


Figure 2.24: The evaluation based on internal and external feedback

Source: Adapted from Butler and Winne (1995)

In phrase 3, strategy enactment, students put the strategies they designed to work and become involved in the learning activities. These strategies are continuously monitored and fine-tuned as they encounter problems while working on the task. These phases are non-sequential. Students can pass over some phases and they can repeat the same phase if needed. The repetition shows engagement and signifies "metacognitive monitoring that happens in any previous or subsequent phase" (Winne & Hadwin, 2008, p. 298). In monitoring, students evaluate products with standards to check if the task meet the objective or if more work needs to be completed. These assessments are also known as cognitive evaluations, and if there is a big disparity

between products and standards, the student may place greater control over the learning operations to improve the product, review the conditions and standards, or both. Such monitoring is object-level based. There is also a meta-level information, or metacognitive, focus. This happens when a student believes that a specific learning task is easy and then interpret this idea into a standard in Phase 2. If the learning product is repeatedly evaluated as unacceptable based on the object-level standards, then this may lead to metacognitive monitoring to decides if the task is really a difficult one. And when the assessment indicates that it does not match the earlier standard that the task is an easy one, then the metacognitive control strategy will recommend a harder task. The change in standard influences other standards created in the goal settling at Phase 2.

The change in goals is likely to result in an evaluation of past material or the learning of a new study strategy. This explains the "recursive, weakly sequenced system" (Winne & Hadwin, 1998, p. 281) in which the monitoring of products and standards within one phase can help to update of products from earlier phases. The presence of monitoring and control in the cognitive architecture permit these processes to affect each phase of SRL. To evaluate students' cognitive processes, standards are used. Standards in Winne and Hadwin (1998) model stemmed from students' assessments of task and cognitive conditions. The monitoring of products and standards may result in re-evaluations of these goals and the methods of achieving them. In the adaptation phase, students evaluate the outcomes, their strategies, and the whole learning process and make a final adjustment according to their evaluation of the learning episode. Students gauge their own task understanding based on external and internal element.

Externally, students can compare their work with that of their fellow classmates or externally according to grades or judging from their past experiences and knowledge about a task. same task can serve as their standards. Figure 2.26 highlights the processes of control and monitoring in establishing standard(s) for task(s) in the Information Processing Model of SRL. Figure 2.27 shows the paths of internal and external feedback in the strategy enactment phrase.

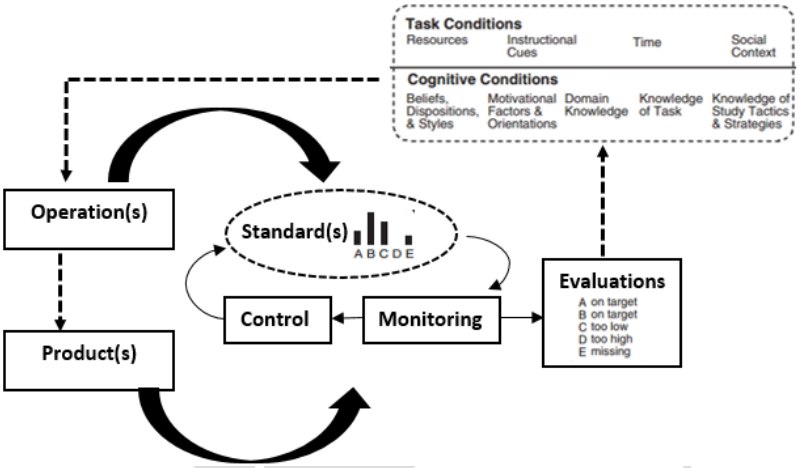


Figure 2.25: The processes of control and monitoring in SRL.

Source: Adapted from Winne and Hadwin (1998)

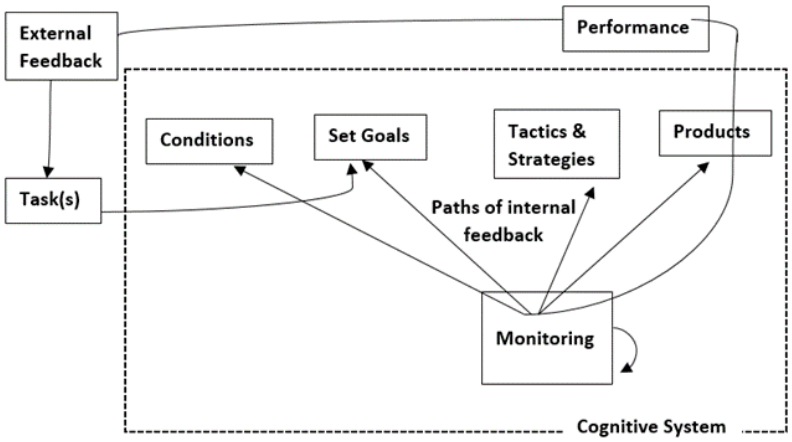


Figure 2.26: Internal and external feedback paths in the strategy enactment phrase

Source: Adapted from Winne and Hadwin (1998)

How learners create goal is seen as important. Research advocates that specific objectives than more general ones as production rules are more effective (Oettingen, Honig, and Gollwitzer, 2000). Monitoring can be defined commonly as "deliberate attention to some aspect of one's behavior" (Schunk, 1991, p. 267). Figure 2.28 shows the establishment of standard(s) and the cognitive evaluation processes.

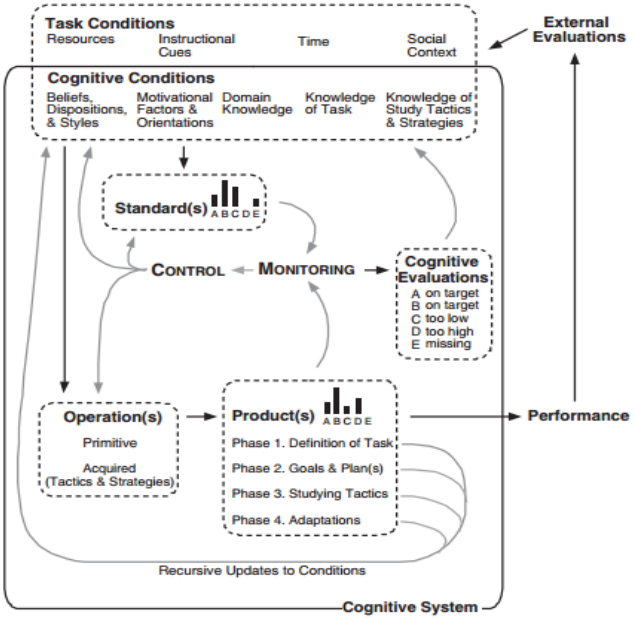


Figure 2.27: 4 phases model of SRL and the establishment of the standard(s) based on the evaluation processes

Source: Winne and Hadwin (1998; 2008); Pieschl, Bromme, Stahl (2008)

2.3.2.3 Integrating the Information Processing model of SRL to mCSCL

Greene and Azevedo (2007) cited that researchers should triangulate among multiple measurement tools to appropriately comprehend learners' noticeable activity. For this research, to understand the mCSCL, it is essential to apply the SRL Theory in which learning behaviors can be

tracked through behavioral patterns and interactions to understand the very subjective metacognitive thinking of learners in the way they collaborate on a mobile platform for new knowledge co-creation. The learning pattern and behaviors based on this model become vivid when it is transformed from self-regulated to co-regulated learning and SSRL bases. The integration of learning enriches as learners engage in more active discussion and interaction becomes dynamic and spontaneous on a mobile and social network basis. When the model of the self-regulated learner is extended to include mobile technologies as a learning tool, the skill set also includes the ability to learn in collaborative contexts as well as being able to engage in construction of knowledge with access to the Internet at their fingertips. Figure 2.29 illustrates the shift from a 'MY', 'YOUR' to the 'SHARED' regulated learning using Information Processing Model.

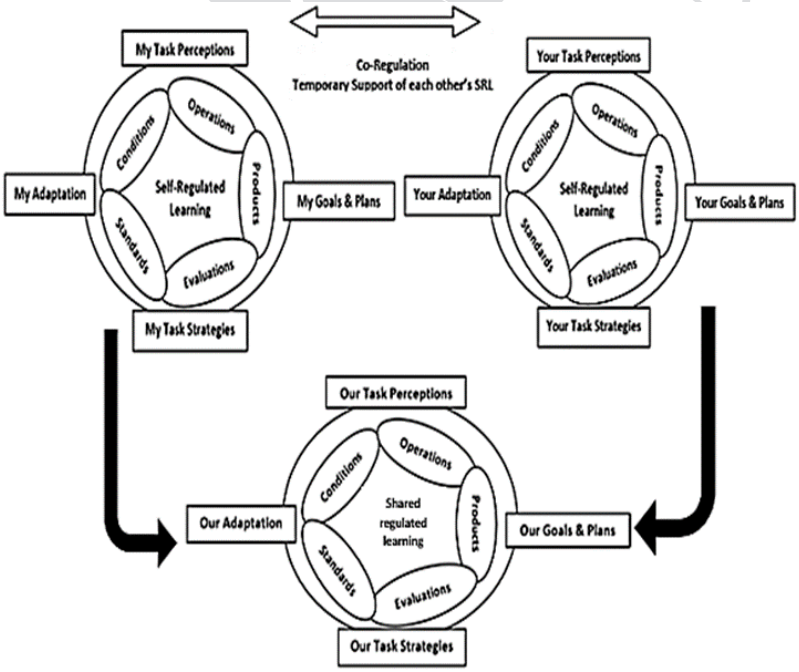


Figure 2.28: Regulated learning in the Information Processing model

Source: Adapted from Winne and Hadwin (1998; 2008)

2.4 Research Questions

The literature demonstrates that ML can happen in three different ways, self-regulated, co-regulated and SSRL. This research plans to explore the relationship between these through the following questions in different contexts.

1. How do students perceive ML?
2. How do learners use mobiles to facilitate learning processes?
3. What factors influence ML?
4. To what extent does regulated learning with mobiles facilitate co-creation of new knowledge?

2.5 Theoretical framework

The theoretical framework as presented in Figure 2.30 consists of 3 important theories and models to new knowledge the co-creation in the ML environment. The first is the SRL Theory by Järvelä and Hadwin (2013). To support this theory, the Information Processing Model (Winne & Hadwin, 1998) is used. For mCSCL, the boundary crossing procedure theorized by Akkerman and Bakker (2011) is incorporated into the research framework. The mobile devices are perceived as the enabling or restraining tool in the co-creation process in learning. This research sees knowledge as a practice and meanings is socially constructed through interaction.

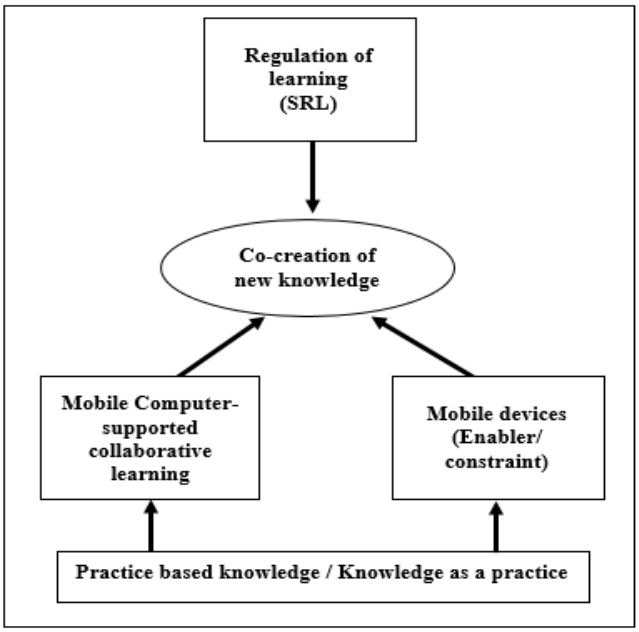


Figure 2.29: Theoretical framework

Source: Researcher's own composition

CHAPTER 3

RESEARCH METHODOLOGY

While Chapters 1 indicates research opportunities in ML, Chapter 2 discusses the cross boundary mechanism and SRL for new knowledge co-creation in mCSCL. Incorporating MIM to the study enables the observation and analysis of the actual or practical learning processes. Integrating both concepts helps to answer RQs and meets research objectives. Chapter 3 builds on these factors to develop a research method that gives a philosophical approach to investigate how they can accomplish relevancy and rigidity through action research.

3. Introduction

Research is about producing knowledge on what one deems the world to be (Lee & Lings, 2008, p. 6). It is about generating new knowledge and its development is based on the reasoning of what is known and the way it is known (Jankowicz, 2005; Quinlan, Babin, Carr, Griffin, & Zikmund, 2011). This emphasis on the nature of an individual's reality is associated to the notion of logical thinking (Jankowicz, 2005). However, Zikmund, Babin, Carr, and Griffin (2010) referred individual's reality to inductive reasoning which is thinking based on a series of actions that helps forecast an outcome. These perspectives of reasoning seem inconsistent as they have diverse starting points. Nonetheless, both are based on the mental processing of information and encapsulating views of the world drawing conclusions from both standpoints on how truth and knowledge are regarded and blended into what is reliable (Johnston, 2014). Hence, determining the position of the researcher is the starting point of the

research process as it underlies the philosophical assumptions guiding a valid research, and appropriate research methods to develop the knowledge in each study.

3.1 Research paradigm

This paper adopts the philosophical terms and structure based on two research textbooks. First, Research Design (4th edition) by Creswell and second, Management and Business Research (5th edition) by Easterby-Smith, Thorpe and Jackson. The researcher uses an interpretive tradition with an ontological belief that reality is socially constructed and a subjective epistemology. The ontological beliefs are that 'multiple realities are constructed through our lived experiences and interactions with others" (Creswell, 2013, p. 36). Epistemologically, "reality is co-constructed between the researcher and the researched and shaped by individual experiences" (Creswell, 2013, p. 36). This social constructivism framework is considered suitable as data gathered are mainly from learners' reflection on ML and presents evidences of new learning patterns to co-create new knowledge using MIM. As ML changes the existing learning strategies, it offers students more flexibility to manage their learning experiences. To understand these experiences, Steedman (1991) noted that most of what was known related to the sense making of the people and not just the scientific knowledge presented. It is the people whether individuals or groups that interpret this reality. This explains why, Hammersley (1992) stressed the fact that reality was socially defined and guided by the subjective experiences of everyday life. In other words, the views of the learners are subjective depending upon the individual learning experiences in his or her mobile usage and thus there can be many truths. The ontology that fixes this nature is that of relativism. Relativism is the ontological position of the constructivist paradigm (Guba, 1990). Social constructionism sees the

importance of everyday communication between people and how they use language to construct reality in their world. It regards social practices people engaged in as the focus of enquiry. To maintain, modify and reconstruct subjective reality, conversation is needed (Berger & Luckmann, 1991). Subjective reality embeds concepts that can be shared with others in non-problematic ways because there is shared meaning and understanding. Thus, there is little need to redefine every time when these concepts are applied in the daily interaction and our assumption of reality is often taken for granted.

Similarly, in the ML context, interaction via mobile applications has been acknowledged as an accepted mean of interaction and 'a fact of life, a way of being in world' (Lewis & Fabos, 2005, p. 470). This is especially so for students as MIM becomes one of the most preferred choice of communicative tools among themselves and with others. Many researchers such as Abrams, Wang, Song, and Galindo-Gonzalez (2014), Mann and Stewart (2000), Hine (2002), Seymour (2001), Jones (1999) and Synnot, Hill, Summers, and Taylor (2014) explored the use of online tools for research and Stieger and Göritz (2006) found that the widespread use of MIM had made it suitable to conduct scientific online interviews. Current mobile technologies enables MIM to support the exchange of text messages, spoken language, video and files. Compare to face-to-face interviews, MIM takes place in a less informative social environment and is more loosely structured. Recent research by Cocco and Tuzzi (2013), Schober et al. (2013), Brenner and DeLamater (2014), Schembre and Yuen (2011) and Kuntsche and Robert (2009) relating to survey methodology indicated that survey data collected using text messages on mobile phones or Web browser applications was possible and could produce high-quality data. MIM messaging

enables users to chat ubiquitously online using text messaging, voice messaging or video call. These forms of interaction make MIM closely weave across the fabric of people's everyday lives. The instantaneous exchange of text messages back and forth also creates a co-presence sense of being together among the communicators. Written communication can induce strong feelings and reactions in its readers (Watson, Peacock, & Jones, 2006). With the chat room function, individuals can set up chat groups and text message transmissions can be exchanged among multiple users simultaneously.

Compared with other communication technologies, the features of instant messaging are more similar to face-to-face communication (Hsieh & Tseng, 2017). The short transmission time and immediate interaction make it possible for a near synchronous one-on-one experience (Nardi, Whittaker, & Bradner, 2000). This synchronicity enhances the sense of co-presence, particularly with tasks that require rapid interactions (Nardi et al., 2000). Students use mobile applications to send real-time text messages to a friend or a group of friends at no cost (Amanullah & Ali, 2014). Jones, Edwards, and Reid (2009) found that students would take note of incoming text messages on mobile phones very regularly and sometimes reacting instantly to in-coming message tone. Hence, an important function of instance messaging is its ability to capture users' attention. The attention-getting may motivate students to response and react (Martínez-Torres, Toral, Barrero, & Gallardo, 2007) resulting in enhanced learning experiences. MIM can also be used by students to post questions and the speed of receiving an answer signifies the ease of the two-way conversation between students and teachers (Yao, 2011). Even though there are not many research on the use of text and instant messaging in learning activities, some

advantages include students do not need to be physically in class to perform the activities (Muirhead, 2005), becoming involved in decision making in simulation games (Cornelius & Marston, 2009), collect data from the field (Patten, Sánchez, & Tangney, 2006b) and learn new vocabularies in the language they are learning (Cavus & Ibrahim, 2009). In this study, MIM is used as a research tool to capture the interaction that take place in the ML process of the students and the community involved. The study uses the data analysis method suggested by Gall, Borg, and Gall (1996). Conversation reflects actual practices that enable researcher to use the data for interpretational analysis to look for SRL patterns when describing the phenomenon. Using structural analysis, the researcher further explores patterns from the conversations, texts and activities. Reflective analysis is carried out using the data to help in the description and evaluation of the studied phenomenon based on the judgement of the students and qualified expert. Table 3.1 presents a summary of the philosophical elements, paradigm and research tool of this research.

Table 3. 1: Summary of the philosophical elements and paradigm

Dimension	**Aspect**	**Elements and perspectives**
Ontology	The nature of reality or being.	Subjectivist (Interpretivist) Participants interpret the meaning of ML and reflect their SRL behaviors and learning pattern in the ML process.
Epistemology	The nature of knowledge	Subjectivist (Interpretivist) Participants create meaning around prior knowledge and use it as the foundation for new understanding as they experience the research interactions. Constructionist in that it entails collaborative subjectivist activities to co-create subjective new knowledge & findings through dialogues.
Methodology	How we come to know?	Subjectivist (Interpretivist) Methods used need to recognize and capture the qualitative nature of the interactions over MIM. There is not one reality, only the interpretation of each participant which may be quite different, and potentially different after reflection.

Continue Table 3 1: Summary of the philosophical elements and paradigm

Dimension	Aspect	Elements and perspectives
Axiology	What is intrinsically worthwhile? Where does the value lie in this research and its findings- primarily academic/theoretical or fundamentally practical?	Learners collaborate in the process of learning. The co-create new knowledge through their interaction. They reflect and adjust to their learning when they realize the inadequacy of their prior knowledge. As such, participants develop sense of cooperation, greater engagement, active learning & foster mobile group learning culture. These adaptations create intrinsic value in learning and enhance learning outcome particularly deep learning.
Voice	Who contributes to the knowing and learning?	Teacher, students and community of learners are active participants in the research. Through texting via MIM, their 'voices' reflect their perception and learning behaviors. In particularly, the SRL behaviors using mobiles in the co-creation of new knowledge. Research subjects actively participated in the generation and validation of the findings through self-reflections on their actions.
Learning	The nature of the activity through which learning (new knowledge) is created.	Participatory in that researcher subjects are initiated into learning task whereby they are required to conduct mobile interviews and tasked to share the student-generated content with their new understanding and inputs. This inquiry process requires active engagement of the learners. Facilitator/researcher requires knowledge of ML and skills to facilitate in ML environment.

Source: Adapted from the table structure of Heron & Reason (1997)

3.2 Research timeframe

The research data collection spread over a period of one year from December 2016 to January 2018. The researcher first engaged the students with a three-month pilot study comprising of a series of in-depth interviews. All participants attended courses with ML as one of the teaching method and a channel for communication. Students possessed the required skills to ML. They were active learners and regulated their learning with their mobiles. They had the experience in using mobile in their daily interaction for learning purposes. In parallel with the pilot study, the researcher conducted the first Classroom Action Research (CAR) in the second semester of the academic year 2016. This 15 weeks CAR was conducted in

one of the courses taught by the researcher which comprised of 18 international students. All the participants were informed at the start of the semester that the course used mobile as a learning tool and for instant communications, the freeware Apps, LINE was in used. The first CAR embedded a series of activities and interaction over the LINE Apps between the lecturer and the students both in and out-of-class. These interactions took place within the same group. During the course, the students were assigned with learning activities that engaged them in cross-boundary learning via interaction with their community of interest on work experiences. While the students performed their learning tasks over the MIM applications, data were collected based on the texted messages and used to analyze for learning patterns. Regulatory learning behaviors were observed based on the flow of the conversation. The second CAR was carried out in the following semester, academic year 2017. Like the first CAR, the duration was 15 weeks starting from August 2017 and ended December 2017. Twenty-one international students participated in this CAR. Students were assigned to a cross-boundary collective learning activity and to report their feedbacks based on their learning experiences. The insights provided rich data highlighting and supported the concept and practice of new knowledge co-creation in a ML environment. The research timeframe is presented in Figure 3.1.

Figure 3.1: The Research Time Frame

Researcher's own composition

3.3 Research methods: Pilot study and Classroom Action Research

Many learning models built upon the potentials of ML have been introduced but with little empirical support because it was difficult to gather information based on actual and observable mobile learning behaviors. With many influencing factors, it is not easy to predict an outcome through mere testing of a hypothesis in the complex ML environment. This research thus calls for an emergent approach that allows greater accurate representation of the participant's reality. The observed learning situations should not be considered as a "controlled experiment" as the participants in their learning roles have to perform, adjust and adapt in and with the flow of the interactions they have generated. Hence, a true reflection of their actual and not just the potential learning in a ML environment. To capture a broader and deeper understanding of ML experiences, instead of relying on a single technique, the researcher adopts multiple methods. Morgan, Gibbs, Maxwell, and Britten (2002, p. 18) indicated that single method 'could only provide a partial account and might require to be supplemented by other data'. Multiple methods can increase learners' opportunity to contribute to what to say, and help engage and interest them. As such, the researcher recognizes them as active agents in the creation of their worlds.

3.3.1 Pilot study

The pilot study was carried out in 3 occasions comprising of 7 international students from a private university in Thailand. These participants were familiar with ML and were able to provide the most credible information to the way they learn with mobile technologies. They were 3rd and 4th year students and willing share information or "their story". During the interview, participants used

texting to converse their ideas and opinions. The interview provided in-depth information pertaining to participants' experiences and viewpoints on ML. With their first-hand experiences in ML, participants are able to convey their thoughts and opinions can be converted into valuable information for the study (Turner III, 2010). The researcher invited the participants to join a chat group. When participants added themselves into the group line, the researcher explained the purpose of the discussion. Even though the discussion took place over the mobile apps, the participants and the researcher were in the same location and the discussion was 'face-to-face' with mobiles on hands. With the consent to share their experiences, participants self-introduced themselves. The consent is important as it is an indication of participants' willingness to freely and truly share information or "their stories" (Creswell, 2007, p. 133). The information was digitally captured on the group Line. The demographic information about participants are presented in Table 3.2.

Table 3.2: Demographic information about participants

Name	Nationality	Age	Institution and Program	Year of study
Student J	Chinese	23	UTCC/ (BBA)	4th year
Student S	Chinese	22	UTCC (BBA)	4th year
Student A	Netherlander	24	Hanze UAS (Exchange program, BBA)	4th year
Student R	Nepalese	23	UTCC/ (BBA)	4th year
Student N	Nepalese	22	UTCC/ (BBA)	3rd year
Student C	Nepalese	22	UTCC/ (BBA)	3rd year
Student G	Nepalese	21	UYCC/ (BBA)	3rd year

Source: Researcher's own composition

All participants agreed to take part in the interview and contributed to the progress of the research. Their support were expressed on the messages left on the Line Apps. The session, participating students, dates, locations and duration of the

three interviews in the pilot studies are presented in Table 3.3. Pictures taken during the interview sessions are illustrated in Figure 3.2.

Table 3.3: Details of the interviews in the pilot studies

Session	Participant	Date	Location	Duration
1	Student N Student Ra Student G	April 17, 2016	Café at the Bang Namphueng Floating Market, Samutprakarn	1 hour
2	Student A Student R	May 4, 2016	UTCC, student lounge	2 hours
3	Student J Student S	Feb 1, 2017	Café at Sairom Restaurant at Banpu, Samutprakarn	1 hour 35 mins

Source: Researcher's own composition

Figure 3.2: Pictures taken from the pilot study

Source: Researcher's own composition

The pilot study is carried out to narrow the research gap between what is known to us and what we desire to uncover (Shakedi, 2012, p. 50). Farmer (2005, p. 60) cited that MIM Apps were “powerful applications and have had incredible potential within educational and learning environments”. Adopting the view of Silverman (2016), the researcher sees the use of MIM in research as a tool of communication, a place for communication and as a way of being in the world. In social science research, pilot study can be utilized in two different ways. It can be used to conduct small scale feasibility studies as trial run in preparation for the main study (Polit, Beck, & Hungler, 2001) or in the form of pre-testing or ‘trying out’ of a specific research approach (Baker, 1994, p. 182). Piloting gives researchers valuable implementation experience (Oppenheim, 1992), preventing a waste of time/effort; helping to avoid responses difficult to interpret. Piloting of research schedules is important in increasing reliability and validity (Van Teijlingen & Hundley, 2001). If there are any weaknesses in the research, a pilot study can detect and address weaknesses to make changes before starting the investigation (Kvale, 2007). It can give advance warning about where the main research may fail (DeVaus,2013, p. 52).

In accordance to Van Teijlingen and Hundley (2001) guiding principles to qualitative research, the researcher acknowledges her ethically obligation to conduct and report the outcome of the pilot study findings to inform the research community of pitfalls. The researcher took note of the pilot study procedures to enhance the internal-validity of research instruments in several ways such as gaining feedback to identify doubts, recording the time used to complete schedules and to revising or re-piloting again as recommended by Peat (2001).

Gall, Borg, and Gall (2003) suggested three interview styles namely general interview guide approach, conversational interview and open-ended interview. To allow some flexibility in its composition, the researcher integrated the general interview guided method with open-ended questions. The former is much more structured than the informal conversational interview (Gall et al., 2003). The researcher remains in the driver's seat with this type of interview approach, but flexibility takes precedence based on perceived prompts from the participants. To ensure that the participants were relaxed in informal ambience, the researcher conducted the interviews in comfortable environment such as café or the student lounge for examples.

To improve the instrumentality and address potential biases, the researcher followed McNamara (2009) principles in interviewing by first choosing a setting with little distraction, then explaining the objectives of the interview and addressed terms of confidentiality as well as the interview format. The researcher also indicated the duration of the interview and informed the participants to keep the group Line open for future contacts if needed. Lastly, participants were asked if they had any questions before the interviews. The interviews began with a short briefing of the research, followed by a few personal background questions. The researcher explained the purpose of the online discussion. All participants and the researchers were present in the same physical areas. The researcher was fully aware of the progress of the discussion. The discussions focused on users' perception of ML and their experiences in co-creating new knowledge in learning using mobiles. The researcher avoided using closed ended questions so that participants could openly shared their ML experiences that were unobtainable through closed end questions. The participants can

tell their story in a flowing narrative that give the researcher a great deal about the phenomenon (Shakedi, 2012, p. 13). Upon receiving the questions posed by text, participants responded by simultaneously texting their views on the issue that were discussed. The questions posed were open-ended questions requiring the participants to give their insights into the ML experiences. When the interviews were completed, data were collected and transcribed via a process of categorization. Questions asked in the pilot study are presented in Appendix 4.

3.3.2 Classroom action research (CAR)

As one of the significant gap highlighted in the LR, much of the research conducted in the area of ML was based on the potential influences of the mobile devices in education. There was inadequate actual research conducted with supporting evidences and this resulted in the limited number of theories on ML. Using action research is deemed appropriate to bridge this gap between actual practices and research based understanding (Somekh, 1995, p. 340). It can help to solve the seemingly persistent failure of research (McCormick & James, 1988, p. 339) to have an impact on, or improvement to the practice (Rapoport, 1970, p. 499).With AR, the researcher contributes not only to teaching practices but also in developing a theory for ML can then be shared with fellow teachers to make “learning practices more reflective” (Elliot, 1991, p. 54).

Kemmis and McTaggart (1988, p. 10) described action research as a plan, an act, an observe and reflect that was more systematically and rigorously activated in everyday life. The motivation behind action research is the quest for understanding and improving the learning atmosphere (Laker, 2001, p. 45). Coghlan and Brannick (2014) added that it was appropriate to use action research to explore participants’

interactions for meanings and applying these "collective self-reflective to improve the rationality and justice of the educational practices". Zuber-Skerritt (1996, p. 68) and Carr & Kemmis (1986, p. 162) shared the same view that action research brought about change, innovation, practical improvement, development of social practices and the practitioners' better understanding of their practices'. The focus on practical innovation comes with the idea that "knowledge which includes values is context sensitivity and situation dependent" (Bennett, & Bennett, 2014, p. 42) and "the application of values require more interaction to better understand the context in which they are being applied, and the anticipated results of decisions and actions" (Avedisian & Bennet, 2010, p. 257). Hence, action research is a systematic learning method where people can help to theorize their practices (Kemmis & McTaggart, 1992). There are four types of AR, namely collaborative action research, critical action research, classroom action research (CAR) and participatory action research. The approaches, stakeholder involved and purposes are presented in Table 3.4.

Table 3.4: Approaches to action research

Approach	**Stakeholders involved**	**Purpose**
Collaborative action research	Involves multiple researchers. In education, this may include school and university personnel or teachers and school administrators.	To share expertise and foster dialogue among stakeholders
Critical action research	Involves wide collaboration. In education, it may include university researchers, school administrators, teachers and community members.	To evaluate social issues and use the results for social change
Classroom action research	Involves teachers in their classrooms; can involve groups of teachers examining common issues	To improve classroom practice or to improve practices in the school
Participatory action research	Involves collaboration among stakeholders in a social process.	To explore practices within social structures; to challenge power differences and unproductive ways of working (critical) and to change theory and practices (transformational)

Source: Adapted from Hendricks (2008)

For this research, CAR was selected for the purpose of collecting rich data and enabling the teacher cum researcher to comment on the classroom process at hand to improve classroom practices. When action research is carried out by a teacher, it is referred to as "classroom action research" (CAR). To conduct CAR, teachers identify their problems or areas for improvement, and address them through the practices of inquiry, action, reflection, and sharing (Capobianco & Feldman, 2010). According to Mettetal (2012), to optimize learning, instructor needed to find out what works better in a particular situation and CAR was one method that could be used for this purpose. Mettetal (2012) cited that CAR was less formal than traditional educational research, but more methodical and data-oriented than mere teachers' reflection. It is an on-going process of problem formulation, preparation of interventions, implementing interventions, observation and analysis of results, and reflection. Thus, it often proceeds through several such cycles before a satisfactory solution can be found (Andriani & Antoro, 2011). The outcomes of CAR can enhance the knowledge base. CAR also goes beyond individual reflection to use informal research practices such as a brief literature review, group comparisons, and data collection and analysis. The triangulation of data can help to attain validity in the research (Mettetal, 2012).

Qualitative classroom action research (QCAR) has been regarded as an alternative approach enabling teachers to gain more understanding in increasingly complex classroom contexts (Buaraphan, 2016). QCAR allows researchers to focus on the context, using an emergent design to enrich description (Sallee & Flood, 2012). According to Klehr (2012), this inductive approach could help the facilitator and researcher to get deep range of data in the classrooms and the ongoing, reiterative process of data generation, analysis, reflection, and action could also assist the

researcher to understand students through their perspectives, taking into consideration the contexts students were bounded with. This can be time-consuming. (Sallee & Flood, 2012).According to Zuber-Skerritt (1991), action research advanced as a cycle of joint planning, action, observation and reflection, where the reflection phase would lead to further cycles of planning, acting, observing and reflecting in a spiral of learning. Different writers have used different terminology for the steps in the action research cycle. Coghlan and Brannick (2010, p. 8), described these cycles as constructing, planning action, taking action and evaluating action. Kim (2009) used the terms like 'Strategize', 'Apply', 'Evaluate', and 'Reflect'. The action research spirals of Saunders, Lewis, and Thornhill (2009) included the process of diagnosing, planning, taking action and evaluating. Saunders et al. (2009) referred diagnosis to fact finding and analysis. Diagnosing can allow action planning and decision on what actions should be deployed. Actions will then be performed and evaluated. The next cycle will involve more diagnoses. Earlier evaluation can be taken into consideration and new planning for more actions will take place. These actions and evaluation will be repeated as it evolves. The final theme suggests that action research should be more than the immediate project. The findings can inform other contexts. At the final cycle, Eden and Huxham (1996) suggested that it would lead to the development of theory. These repeated cycles of research action and learning can help in the development of understanding and induce changes in the ML context as a the main emphasis of this research, and meantime enhancing learning experiences for both researcher and participants (Shelley, 2012).

The output, 'actionable knowledge' (Coghlan, 2007, p. 293) can be useful to both the practitioner and academic communities. The close relationship between

knowledge acquisition and action; signifies ‘research in action rather than research about action’(Coghlan & Brannick, 2010, p. 4). Action can be taken to improve practice and the research can generate new knowledge about how and why the improvement comes about. In this study, the researcher followed the steps indicated by Mettetal (2001) for CAR by first identifying the problems based on her observation on the student engagement in her courses using mobile devices. Mettetal (2001) 9-step to conduct CAR is presented on Table 3.5.

Table 3.5: Steps to conduct CAR

Step	**Content**
Observation and reflection of one’s teaching practice	Knowledge of strengths and weaknesses of one’s teaching practice.
Formulation of a research problem	Research problem must be an aspect of one’s teaching practice that may be improved.
Formulation of preliminary hypothesis	Tentative answers to the research problem.
Literature review	Knowledge of learning theories Knowledge of theories, strategies, and best practices that deal with the selected research problem.
Research design	The methodology and procedure to conduct the research: Quantitative methods; Qualitative methods; Combination of qualitative and quantitative methods
Data collection	Multiple sources of data collection: student performances, teaching and learning activities, surveys, observation, student reflections, course portfolio, videotape of classroom teaching, journals, and student interviews.
Data analysis	Analysis of collected data through varied techniques and procedures. Theories identified in the literature review
Implementation of results	Change to the teaching practice
Evaluation of implemented results	New CAR to evaluate whether the implemented changes improved the teaching practice and the quality of student learning
Dissemination of results	Presentations to colleagues to help them reflect about teaching and learning and find potential solutions to similar problems

Source: Mettetal (2001)

In the first CAR, 14 international students were divided into 4 groups but only three groups’ work were accepted . The last group failed to capture the mobile interaction of the learning process. The data analysis of the CAR helped to answer the

RQ concerning how students regulated their learning in ML activities. For this CAR, students were assigned to conduct mobile interviews via their MIM Apps to learn about the concept of Corporate Social Responsibility from their interviewees' who had the expertise and practical experiences. The task of the researcher was to identify the flow in the regulatory of learning and the students' SRL behaviors. The findings were analyzed using Conventional Analysis (CA). The details of the participants are presented in Table 3.6.

Table 3.6: Participants by group in the first classroom action research

Group 1	Group 2	Group 3
Facilitator	Facilitator	Facilitator
Learning partner (LP1)	Learning partner (LP2)	Learning partner (LP3)
Participant H	Participant P	Participant A
Participant C	Participant I	Participant W
Participant B	Participant T	Participant U
Participant JJ		

Source: Researcher's own composition

With the completion of the first CAR, the findings and analysis enabled the researcher to further comprehend the regulation of learning in the mCSCL. With this understanding, the researcher moved towards the co-creation process and uncovered how students regulated learning behaviors accelerate the co-creation of new knowledge process. To overcome this challenge, the researcher carried out the second CAR with a second group of 21 students (Participant 1 to Participant 21). In the second CAR, students were assigned to generate a broader sense of working and living experiences based on their group interviews with participants from different countries. This activity signified cross boundary over space as participants engaged in

co-regulated learning. The unit of analysis was the interactions of students across boundary learning. The level of construct was group level. The data collected was based on multiple sources through the recorded texted messages, observations, discussion and interviews. Research data comprised of MIM interaction during the learning and sharing process. The data indicated the mCSCL activities of the students and the MIM interaction demonstrated the regulation of learning in place.

To understand the working and living experiences of others in different countries, students collectively developed a list of standard questions in class to be used for their interviews. Students took note of the new questions posed. The extension of the listed questions was a good indicator of the level of metacognitive interaction. Upon gathering the information from the interviews, students integrated their work and analyzed the recorded texted messages to compile a list of shared experiences of their interviewees from targeted countries. From the compiled list, students worked together to make contrast and comparison to create general impression of these experiences to derive on shared understanding of common experiences in different countries. The learning activities signified mCSCL and the regulation in learning of the students which together enabled them to generate content that reflected the new learning. The new knowledge co-created and feedbacks based on their metacognitive experiences provided crucial supporting evidences of actual practices in ML.

To complete the learning activity, students in the second CAR individually wrote a report on what they had learned. The reflection of the learning were included in the report. Students were asked to reflect on their impression of ML before they engaged in the activity. The feedback allowed the researcher to gain insights into how

the students perceived the ML activities, the preparation and effort made by the students, the apprehension shared among the students as well as the way students strived to perform better. Students were further asked to think about what had happened during their interactions. The responses of the students enabled the researcher to understand the learning processes. The researcher sought to identify problems and barriers encountered in the learning as well. Students were also asked to make a reflection after the interviews. The researcher was interested in how students' perceived the given task and importantly, to find out how the cross boundary learning generated new knowledge. A list of 27 open-ended questions, presented in Appendix 5 was provided to the students as guide on how they could approach their written assignment. These questions, focused on the way students collaborated in the mobile social setting, sought to capture the data on the metacognitive experiences as well as the regulatory of learning from an individual to group and among groups. The outcomes of the metacognitive interaction over the MIM provided good evidences to bridge the research gaps on the sustainable use of mobile devices.

3.3.3 Case study in CAR

From the CAR, the researcher developed case studies based on the thoughts, belief and experiences of the students. Besides taking a critical and reflective perspective, the researcher believed that there were lessons to be gained from the participants which would add knowledge to the literature on how CAR could potentially studied the regulatory ML behaviors of students. As an intensive study method (Jacobsen, 2002), case study enables detailed analysis in the individual case (Lindvall, 2007). The learning processes of each group of participants in the CAR were selected as an individual case study for in depth study. Using case study, the

researcher presented a complete view of the research topic and explored the students in their natural setting that ensured high validity. Taking the role as an active learner, the researcher was able to “tell the story from the participants’ views, rather than as an “expert” who passed judgment on participants” (Creswell, 1998, p. 18). Case study method also enables researcher to attend to the problems of the lacking in existing theory in ML. This aspect is highlighted by Naismith et al. (2004) that the application of theory to use the mobile technologies for educational purposes was lacking and there was the lack of detailed feedback for learners. Park (2011) also reckoned that the most critical issue encountering ML research was the absent of concrete theoretical framework. In addition, researchers such as Flyvbjerg (2006), Stake (1978), Yin (2007), Dasgupta (2015) and Eisenhardt and Graebner (2007) emphasized the closeness between case studies and reality events and the how the reality could be a source to new theories. This research therefore used case study to bridge the gap in the lack of theoretical framework in mCSCL in ML and SRL of students. The approach would lead the researcher to information on the 'how', 'what' and 'why' questions in particular how the intervention of ML generated new knowledge co-creation among students today.

3.4 Data analysis

For data analysis, the researcher followed Creswell (2014, pp. 196-200) six-steps approach. The data for analysis were first, organized, prepared and reflected the data. Next, comprehending the data before coding it. Followed by the provision of explanation of the setting or people and categories or themes for analysis. Then the findings of the analysis were presented. Lastly, the interpretation of the results of the analysis. Towards the end of the process, the research sought answers to

what the evidences had found. With the data gathered, the next step was to make sense of the data and the practical significance of the findings. Data analysis involves ‘peeling back the layers’ of data, therefore allows the researcher to aggregate data into a small number of themes to for analysis (Creswell, 2014).

Data analysis in this research was accomplished in two ways. First, by using conversational analysis (CA) for the first CAR case study. Second, using the First and Second Cycle Coding Methods for coding as suggested by Easterby-Smith et al. (2015). For first CAR, the researcher analyzed the regulated learning patterns of the students via the texted messages to identify the flow of the interaction from an individual to group and vice versa and how the groups socially shared their learning using CA. CA is used to uncover underlying rules and structure of the interaction that took place. The fundamental assumptions to CA is that all interaction demonstrate stable, organized patterns and that people are oriented to and produced that order themselves when they interact with each other (Easterby-Smith et al., 2015),. With this sequentially organized interaction, it is likely to make sense of an interaction in relation to the ongoing sequence of utterances. Easterby-Smith et al. (2015) also added that the analysis should also be grounded in detail empirical examination of the data. The basic premise of CA is that “by analyzing the structure of talk-in-interaction, the researcher can arrive at an “vast understanding of the way people do things and the kinds of objects they used to construct order in their affairs” (Sacks, 1984, p. 24). Using this analytical method, the researcher discovered and described the order of regulated learning and the rules and practice in the mobile regulated learning.

In the CA, the naturally occurring data of talk-in-interaction was selected on the criteria which the researcher had accessed to. The data were collected and transcribed. The researcher kept an open mind without presumptive ideas of what to expect. Analyzing what was going on, the researcher envisaged how participants constructed and displayed to each other a mutual understanding of what they considered was going on. The data comprised mainly of text from the MIM interaction. It was significant as it displayed the meaning to the regulated learning pattern and behaviors of students. The unit of analysis was the block of text from the MIM interaction in each case study. The data was deconstructed to highlight underlying meanings. The data analysis followed the sequence and structure of the text. CA helps to determine if the current model of SRL is applicable in the ML environment. If there are variation in terms of behaviors and patterns, what will then be changed and how these changes influence mCSCL for effective learning. A summary of the conversational approach is presented on Table 3.7.

Table 3. 7: The conversation analysis approach to data analysis

Conversational analysis	
Purpose of analysis	Reveal underlying rules and structure of talk and interaction
Data	Text and talk
Work done by words	Produce things
Focus of attention	Displayed meaning
Units of analysis	Blocks of text or talk
Treatment of data	Deconstructed (to display underlying rules)
Data analysis	Sequence and structure of talk

Source: Adopted from Denscombe (2014)

For the second CAR, the researchers manually decoded the data due to the volume, depth and details provided by the students. The researcher studied recurring

themes, citing supporting evidences. The focus was more towards practical significance than statistical significance. The data were analyzed using Saldaña (2015) 'codes-to-theory model' for grounded analysis as cited by Easterby-Smith et al. (2015). Grounded analysis could derive structure (that is theory) from data in a process of comparing different data fragments with one another, rather than framing data according to a pre-existing structure" (Easterby-Smith et al., 2015, p. 191). This makes the analysis open to new discoveries, allowing the researcher to understand the meaning of data fragments in the specific context in which it is created. In other words, the perspective or 'voice' of the participants is "amplified".

The characteristics of grounded analysis embeds the understanding of context and time, and is holistically associated with guide analysis. It is faithful to the views of participants and so, it is more inductive. The aims is not to clarify and unite but rather to preserve ambiguity and illustrate contradiction. There are 7 steps to grounded analysis according to Easterby-Smith et al. (2015). A summary table of the steps is presented in Table 3.8.

Table 3.8: Summary of the 7 steps grounded analysis

Familiarization	To sift through all available data, drawing on unrecorded as well as recorded information.
Reflection	Data is evaluated and critiqued under the lens of the frameworks and theories discusses in the literature review.
Open coding	A code is a word or a short phase that summaries the meaning of a chunk of data (statement, sentence or picture). Codes creates link and make
Conceptualization	The data is categorized into key concepts, patterns and categories and some were discarded due to their low contribution to the project.
Focused re-coding	Once significant codes and categories have been established, researcher codes and recodes larger amounts of data with a limited number of more focused codes. The secondary cycle coding can be highly iterative and require researcher to go back to check against the original data, comparing incidents in order to identify particular properties.
Linking	Key concepts and categories are linked to the theoretical framework.
Re-evaluation	With the feedback from my advisor, I re-evaluated parts of my analysis

Source: Adapted from Easterby-Smith et al. (2015)

An illustration of the ‘codes-to-theory model’ for grounded analysis is presented on Figure 3.3 as accordingly to (Saldaña, 2009, p. 12). During this process, the researchers identify emerging categories and coded them. These initial codes and categories are tentative and change as the analysis process progress. After initial coding, the researchers take time for reflection by means of the writing of analytical memos (Saldaña, 2013, pp. 100-101).

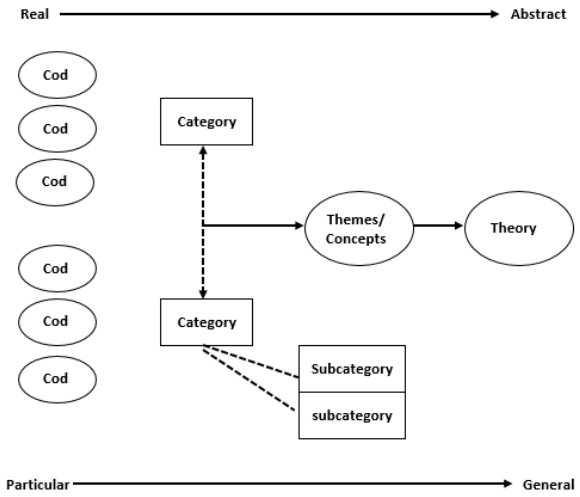


Figure 3.3: The ‘codes-to-theory model’ for grounded analysis

Source: Saldaña (2009, p. 12)

3.5 Researcher role in In-Class and In-Line observation

In this study, the researcher took a multi-faceted role as a member of the action research group. By assuming a multiplicity of roles throughout the study, the researcher can shift roles to meet changing circumstances and needs. This active participative role enables a self-reflective, critical, and systematic approach to exploring the teaching context (Burns, 2010, p 2). Collaborative relationship is established allowing the researcher to provide optimal support to the research

participants at various stages of the project. Throughout the working period of the project, the researcher actively observed and reflected on the development of the learning. Observation is ‘another means to sit and observe in the actual environment without interfering with an unobstructed setting” (Yin, 2014, p146). The researcher observed how students regulated themselves in terms of time and effort into the cognitive process of discussion both online and offline. Just as important, the flow of information and the co-regulated and shared regulated behaviors in the working process of the students were observed. The researcher remained closely to the participants to understand the eclectic and highly qualitative nature of the research methodology. To ensure reliability and avoid criticism, the researcher reminded unbiased about what were regarded as evidence, sought to keep records to describe what had accurately happened to analyze based on own judgements, reactions and impressions about what was going on. To be consistent with Coghlan and Brannick’s approach, the researcher avoided influencing on students’ interpretation of what the interactions meant. The researcher collated the data and discussed it and not to influence the content.The researcher was aware that being a part of the context and studying her own students would traditionally be viewed as biased (Creswell, 2007). However, she believed that the specialized knowledge and professional experience in the ML process made the study possible because her observations of the process were specific and context-rich. No matter how bias it sounds, if the teacher understands the full learning cycle in ML in terms of curriculum, assessment, and instruction, it can be seen as a strength (Black & Wiliam, 1998). Hence, the researcher participated with close observation, reflected, responded to students’ questions and feedbacks and ultimately making adjustments to improve on classroom practices. Without a good

understanding of the socialization context in ML, it would be difficult to provide reliable and valid answers to the RQs. Herr and Anderson (2005) and Holly, Arhar, and Kasten (2009, p. 52) reckoned that although bias was "natural and acceptable" in action research, teachers could take steps to further reduce these biases.

There were challenges as the researcher had to have the time and alertness to follow and observed several groups simultaneously over a period of time. The difficult task in observation was not to intervene without asking questions or challenging students' ideas in that sense. The second challenge in the observation was the need of the researcher to track the interactions over the MIM Apps which was sometimes difficult because students worked into the late hours and perceived the online time as private time and did not wish the "teacher" to be in-line with them. To overcome these problems, the researcher informed the students the need to do the observation for the research purpose and would intervene only when needed at the request of the students.

The design of the learning was based on the understanding that the interview was an interchange of views between two persons or more discussing about a theme of mutual interest. The students who participated were also the co-researchers as they attempted to "understand the world from the subjects' point-of-view, to unfold meaning of peoples' experiences" (Kvale, 1996, pp. 1-2). The interview procedures had enabled the researcher to identify some themes that directly associated with the research questions on which they wanted to collect information and then built questions around those themes. These questions were "directed to the participant's experiences, feelings, beliefs and convictions about the themes in question" (Welman & Kruger, 1999, p. 196). With the findings, the researcher took action to make

decisions about mobile teaching strategies. To complete the CAR processes, she shared the findings at the ICCSEI 2018 conference (Singapore) in January 2018. Following these steps, the researcher tried to validate and assess the quality of the research.

3.6 Developing research trustworthiness and quality in this research study

Patton (2001) stated that validity and reliability were two aspects qualitative researcher must attain to when designing a study, analyzing results and judging the quality of the study. In quantitative research, reliability refers to the exact replicability of the processes and the results. To ensure reliability, the researcher acknowledges that trustworthiness is crucial and agree with Seale (1999, p. 266) that the “trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability”. Credibility depends on instrument construction, but in qualitative research, “the researcher is the instrument" (Patton, 2001, p. 14) and it rests on the capability and strength of the researcher (Golafshani, 2003). Generally, the issue of trustworthiness in qualitative research is questioned by positivists, because their concepts of validity and reliability can not be discussed in the same way as in the naturalistic work (Shenton, 2004). Guba therefore proposed four criteria to pursuit of a trustworthy study (Guba, 1981) in qualitative research. The constructs linking to the criteria used by the positivist researchers are presented below:

1. Credibility (in preference to internal validity)
2. Transferability (in preference to external validity/generalizability)
3. Dependability (in preference to reliability)
4. Confirmability (in preference to objectivity)

Validity in qualitative research means “appropriateness” of the tools, processes, and data (Leung, 2015). Qualitative validity bases on “determining if the findings are accurate from the standpoint of the researcher, the participant or the readers” (Creswell, 2009, p. 190). The researcher followed the criteria as recommended by Guba (1981). As an educator in the ML era, the researcher was fully aware of the need to change and desire to contribute to the development of effective learning with mobiles. Therefore, it was the ultimate goal of the researcher to drive for not just change but change with understanding for the betterment of learning in higher education. To increase the consistency and reliability of a project, the researcher documented all procedures with a detailed protocol. The researcher carefully designed appropriate multi-methods for triangulation of data to take place. Negative case analysis was taken into consideration to ensure honest in the reporting. The researcher also revealed the whole procedure of the methodology so that the procedure could be used by other researchers. A summary of Guba’s four Criteria for trustworthiness is presented in Appendix 6. Following Creswell (2009, p. 191) suggestion, the researcher also checked the transcripts for errors, making sure no derivation in definitions of codes or applications during the coding process and coordinate, document communication from meetings and cross-check codes with different researchers by comparing results that were independently derived.

To ensure the quality of this study, the researcher adopted Easterby-Smith et al. (2015) 8 criteria checklist to assess the quality of the thesis. The researcher ensured that the research topic was worthy and relevant to current understanding of the actual impact of ML. The researcher was rigor in the use of appropriate data, concepts and methods in the conducting the research. To ensure the credibility of the study, detailed

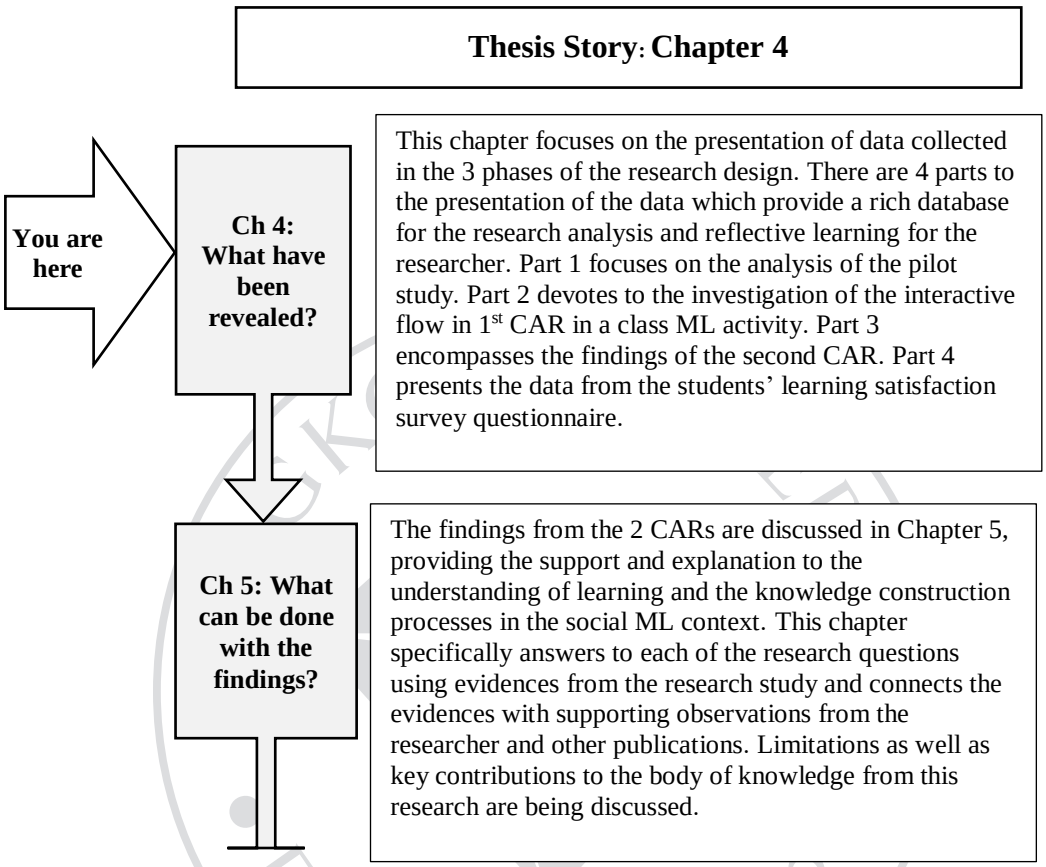
descriptions, providing explication of tacit knowledge and use triangulation for better findings were made. This research could contribute to the understanding of the cognitive learning process of students in new knowledge co-creation and eventually the development of a new theory in ML. The researcher abided to the ethical aspect of doing research in accordance to code of ethics by Bangkok University. Last but not least, ensuring meaningful coherence in adopting the most appropriate methods and techniques in achieving the research objectives.

3.7 Ethical consideration

As this CAR is conducted in real-world settings and involved both open and close communication among the people, ethical consideration is taken as top priority. The principle as stated by Winter (1987) respecting the rights and feelings of students and individuals who took part in the research was followed. The researcher understood that all participants must be allowed to influence the work, and the wishes of those who did not wish to participate must be respected. My work would remain visible and open to others to make suggestions. I had sought permission before making observations or examining documents produced for other purposes. I had provided the descriptions of others' work before being published. I had accepted responsibility for maintaining confidentiality as recommended by Winter (1987). In addition to these principles, I had based my decisions on the direction of the research and derived at a collective sense for probable outcomes. I was clear about the nature of my research process from the beginning, without personal biases and interests. Participants had equal access to information created by the process.

CHAPTER 4

FINDINGS



4. Introduction

In Chapter 4, the analyses and findings of the research are divided into four parts. The first part is the analysis of the pilot study. The findings draw attention to students' perspectives of ML and how their views are crucial in developing a reflective definition of ML in the social context. Insights to the many aspects of ML are highlighted and discussed in this section, with supporting evidences. Most of the evidences emerged from observation, as well as some particular students' quotes pertaining to each specific aspect. The detailed transcripts provide the supported evidences to the flow of the argument in the research. The review of the findings enables a more balanced and reflective definition based on the students' perspective. The second part covers the investigation of the first CAR. With data collected from MIM, the researcher examines students' regulatory learning behaviors in mCSCL activities. The data are analyzed using conversation analysis (CA) to determine the flow of interaction from individual to group and vice versa. The outcomes strongly support the re-examination of the existing SRL models to generate better outcomes in current learning situations. The third part encompasses the findings from the second CAR on the actual students' feedback and conversation in ML designed activities. Students' reflections include metacognitive processes provide the 'observable insights into the students' ML experiences and behaviors in cross-boundary context. These findings are significant as they describe the ways students learn and co-create new knowledge in mCSCL tasks. The forth and last part presents the data from the students' learning satisfaction questionnaire. Students completed the survey at the last class of the semester. The feedback helps to affirm the observations and analytical findings of the research.

4.1 Pilot Study and Findings

The findings of the pilot study were crucial, as the insightful discussions revealed many factors that students felt were important to the effective use of mobile tools for learning purposes. Eight questions were posted on the group Line applications (Appendix 4). The topics discussed were diverse and meaningful, especially when students were able to relate their own ML experiences to assess what attributed to effective learning with today's advanced educational and communication technologies. The text messages of the three pilot studies are presented in Appendix 7 to Appendix 9. Noticeably, students disclosed that effective learning could be socially constructed through the interactions and these were not part of the original course content. Just as important, the findings provided the empirical evidences supporting existing theoretical models in ML.

4.1.1 Perception of ML

Mobility of learning was the first factor mentioned by all 7 participants. Almost all of the students described their ML experiences positively in terms of mobility in learning, with only one exception about possible distractions. Key themes included anywhere, anytime, convenience, speed and breadth of access to information from statements, like "it is always with you wherever you go" and that it was like "learning everywhere at any time" (Appendix 7). Reflective insights and evidence of social learning that emerged from the student interactions included metaphorical statements such as, one could share and get information from an "island" or a "jungle" (Appendix 8). That this meant was that learning was not restricted in classroom or a room together and it could come from a single source or from a complex web or virtual interactions. They perceived mobiles as effective tools

and realized that using mobiles was an important component in their learning process, particularly with the ease of getting information. They reckoned that ML "did not limit the course in the class only" and with one participant relating ML to "change management" in terms of course design and this embedded the "changes in the way things were done inside and outside the class" (Appendix 7). This statement was critical because it demonstrated students expectation and demand in their learning involvement and emerging practices in university curriculum. In the words of Participant R (Appendix 7), "if you interact outside the class, you got to know a lot about their situations and thinking of what they went through outside the class" indicated the desire of students to understand and being engaged in more authentic form of learning. This desire signified students' call for innovative means to how lessons and academic contents should be delivered in school. From this line of thought, participants highlighted new learning culture and behaviors that had evolved as they interacted and created relationships online. They claimed that ML was enjoyable and became more engaged in their learning as they put effort into reading the content (Appendix 7).

An interesting comment made by Participant R who stated that more young adults were engaged in technology and if they could acquire knowledge from the internet, they would be more interested to learn and this helped to improve academic performance (Appendix 8). There was also the benefit of better time management as "retrieving information was no longer time consuming". These themes were reinforced by the other examples stated below and the fact that all comments, except one, were expressed in a positive manner. This showed the willingness to engage in learning activities using mobile devices. Remarkably, based on the first level of

coding using AtLast, a qualitative data analysis program, keywords derived from the pilot study were cross-boundary learning surfaced and closely connected to the concepts of social learning, learning outside classroom, community of learners, knowledge acquisition, and learning outcome. These were what participants had envisaged ML to be.

4.1.2 Desire for greater informal interaction

Participants understood the differences between formal and informal interactions. The desire for greater informal interaction was reflected by the expression that "there was so much more I wanted to learn as a student, but it is constrained by formal learning" (Appendix 7). Frustration towards traditional learning was voiced as participants saw one's hesitation as a barrier to ask and answer questions for the fear of making mistakes. Indecisiveness in class participation was perceived as a hindrance to establishing stronger bondage with teachers as well (Appendix 7). Based on these two factors, participants opined that information gained in class was "one sided". One participant acknowledged the changing method of communication as she claimed that they "live through texting". This denoted changing behaviors and culture in interaction whereby texting to teachers was a part of the learning process (Appendix 8). An interesting supporting example relating to this changing learning process was described by Participant G when she shared her personal experience during her internship training and texted messages with her lecturer. She was excited that she could text and interact about her ideas at work when she said "I was in a brainstorming session at the office and as soon as I got an idea, the first thing that pop in my head was to confirm whether the information that I had

could reflect my knowledge". This ML experience of the student was important as it implied effective virtual knowledge sharing and transfer (Appendix 7).

Using the "wall" as a metaphor to describe what kept the formal and informal learning apart was the willingness of teachers to be part of the virtual world (Appendix 8). Participants saw the use of social media and mobile applications as bridging the gaps between teachers and students citing that "teacher was reachable via the Line application". Apparently with ML, participants envisaged a greater role of the teacher in facilitating in the new learning process. There was also the belief that information provided formally, should be reinforced informally with feedback. The need for feedback had surfaced as a prominent theme as participants saw how ML shaped the path for meaningful learning. This indicated the importance facilitating role of the learning facilitator to ensure that interaction was ongoing, vibrant and of course safe for all participants. This sense of pro-activeness in learning was detected when a participant "orated" that "whenever I had a question, I could just text her (teacher) and she would come back to me with a useful answer. This is of great value ". The statement made was crucial as it indicated the collaboration value participants perceived in their course of learning with mobiles (Appendix 8). Learning facilitation with students throughout the learning process, rather than being restricted to classroom interactions was a change that some teachers might reject. While teaching institutions paid teachers based on hours of face to face interaction, the challenge of such extracurricular engagements might pose issues around expectations. This issue is beyond the scope of this PhD, but will be an area worthy of future study.

4.1.3 ML from Knowledge management perspective

The implications of knowledge management was "texted" about. One participant opined that learning took place outside class in terms of communicating, planning, and execution of task. The use of social media had enabled them to coordinate work as well. Another participant revealed that "there was no mentioning of anything in books, but we did learnt by doing the campaign. It is about management and planning" (Appendix 8). The participant added that "building on others' opinions in order to create one's own was a fundamental part of the learning process". The idea of a more knowledgeable person to interact with for knowledge indicated how learner proactively searched the right person to interact for learning. This added another key concept of regulatory learning when she commented that "Texting with a person who had knowledge gave you the opportunity for a 2-way communication". This line of thought reinforced the theme on the value in learning (Appendix 8). However, there were divided views among the participants as to the effectiveness to the use of MIM and face-to-face communication. In creating new ideas, one participants explained that face-to-face interaction was much more effective as "we could actually encourage one another to participate and contribute". When communication took place online, "it solely depended upon the student initiative" (Appendix 7). This sentiment was a reflection of the participant's personal experiences. Another participant expressed concern that students would be discouraged to converse if some in the chat group dominated the discussion. In other words, those who talked less would be "suppressed" and discouraged to engage in the conversation. Whilst this could be a concern to be monitored, it also applied to classroom learning interactions. There was little evidence of dominance in this

research. In contrast, there was some anecdotal evidence that the alternative view was better supported, with the quieter students being more actively involved virtually than they were in class. This reinforced the importance of monitoring mobile conversation and facilitation quality throughout the learning interactions.

4.1.4 The regulation of learning in ML context

The pilot study uncovered another noteworthy theme related to ML; the regulation of learning. One participant specifically texted her experience in selecting people to assist her study at odd hours cited that "I studied until midnight for my Maths final exam and it was impossible to ask for help on a face-to-face basis (at that late hours). So, I turned to Facebook Messenger to ask my friend from Canada". The self-regulation in her learning process was reflected in the way the student overcame the barrier of time and optimized time differences to her best benefit (Appendix 9).

4.1.5 The co-creation of new knowledge in ML

In terms of co-creation of new knowledge on MIM, one participant described co-creation as "like a new platform to opinion sharing and discussion. I could absorb the knowledge more naturally …. I believed this way (mobile) would enhance my point of views and knowledge absorption" (Appendix 9). On how they could co-create, another participant explained how her initiative to engage in a cross-boundary interaction gained new understanding to a problem and how this knowledge was socially shared to co-create new knowledge.

The theme of knowledge absorption was also mentioned. Student J who was an exchange student to Peru related her learning experience to co and socially shared regulated learning with her 'matchbox story'. A question in class prompted her to find

out why a matchbox campaign was carried out to counter the Zika disease in Peru. A conversation via mobile texting by a teacher in Peru provided the needed explanation to the effectiveness of the campaign. She texted “Finally, I got a good idea and I shared (what I leaned) with my classmates and teacher. Everyone in class received new knowledge”. As for this student, the value of co-creation was “1+1>2” as she felt that “we conducted interaction, we shared our ideas and those ideas might create new ideas to others and more new ideas were created”. She added that “Co-creation taught me how to pick the key information out of communication. I knew the important of information flow in and out. How to generate more ideas made me studied more efficiently” (Appendix 9). Hence, in this learning context, co-creation not only reinforced the learning but also generated greater impact on joint decision making, placing emphasis on the management of knowledge especially in selecting essential information and how to better apply the knowledge for effective learning outcomes.

4.1.6 Defining ML in the socialization context

The findings from the pilot study enabled greater insights into students’ perspective of ML and desired ML methods. The pilot findings are useful in developing a definition of ML as there is a need for a more balanced definition from the Who, What, When and Where, to one that gears towards the Why and How dimensions to reflect active learning which signifies an effective learning process (Shelley, 2017). In Chapter 2 Literature Review, the researcher developed an operational definition based on the socialization context defining ML as a mobile supported social collaboration process where learners with their personal communication tools engaged in interaction with and beyond one’s boundary to share

and generate new knowledge. In addition to the students' reflection in the pilot studies, the researcher refined the definition of ML as follows:

> Mobile learning is a mobile supported socially regulated collaborative learning process whereby learners with their personal communication tools engage in interaction with and beyond one's boundary to share and co-create new knowledge.

This definition embedded the elements of mobile learners, mobility of technology, mobility of learning, regulation of learning and new knowledge creation of learners. The definition as depicted in Figure 4.1 also underpinned the processes through which learners created meaning by exploration and discussion. The process was mobile in nature and it transcended the physical and conceptual boundaries through conversation allowing learners to build a link between experience and concept in order to create new knowledge or meaning. Importantly, the definition reinforced the impact of social learning and the co-creation of new knowledge in regulated collaborative learning.

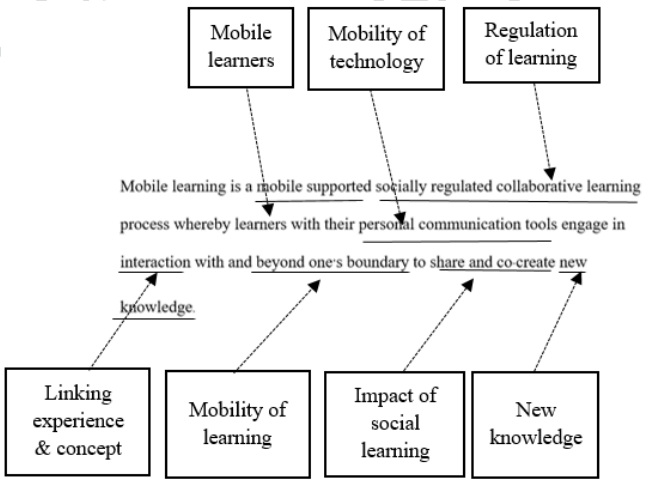


Figure 4.1: Underpinning meaning to the definition of ML

Source: Researcher's own composition

4.2 Findings based on the case study in the first CAR

Using conversational analysis (CA), the researcher studied the regulatory learning behaviors from the flow of interaction and texted messages in the ML activities. The first CAR comprised of 3 case studies and the interactions of each case as well as the students' feedbacks were presented in Appendix 10 to Appendix 17. Through the interactions that took place, it was discovered that the conversational structure did not conform to the existing model of SRL and in fact reflected non-liner SRL processes. In addition, the flows of the regulated learning in mCSCL activities were unpredictable, spontaneous and instinctive in nature. The students' reflection on their mCSCL activities, mobile devices were "great" tools to expand our understanding of the ML processes and how the regulation of learners influenced the learning outcomes. The crossing of boundaries was perceived as supplementing the "not enough" classroom system. Students perceived the need to "collect knowledge from all over the world" (Appendix 15).

In terms of mobile technology, students perceived that "the more we got used to them, the more we benefitted from them as well" (Appendix 15). In support for knowledge co-creation, there was a call for the development of more skills so that "we could apply after we really encountered the real life". Students were optimistic in the boundary crossing approach in ML. One participating student quoted the saying "when there is a way, there is a will" in the use of their "smartphones to empower and facilitate better education" (Appendix 15).

A student used the metaphor of "within a click" to show how they could "break down all physical barriers and to be connected to people all over the world" with online discussion (Appendix 17). These feedback comments from students

indicated that SRL did reinforced and enabled crossing of boundaries to co-create new knowledge when students engaged in ML activities. The flows of the MIM metacognitive interaction based on the three case studies are presented in the Figure 4.2 to Figure 4.10.

4.2.1 Flow of regulation in learning for case 1(1st CAR)

In the first case study, the regulation of learning was clear and strong. Even though all participants were in different locations in terms of specific locality and or country, the flow of communication was non-chaotic and well supported by all the participants. The facilitator first took the lead to make the connection with the learning partner (interviewee). Invitation was made and the participants joined immediately to the group Line. Once, the team was ready, students took the initiative to discuss and 'negotiate' the time and day for the interview. The group interaction with the interviewee are presented in Figure 4.2.

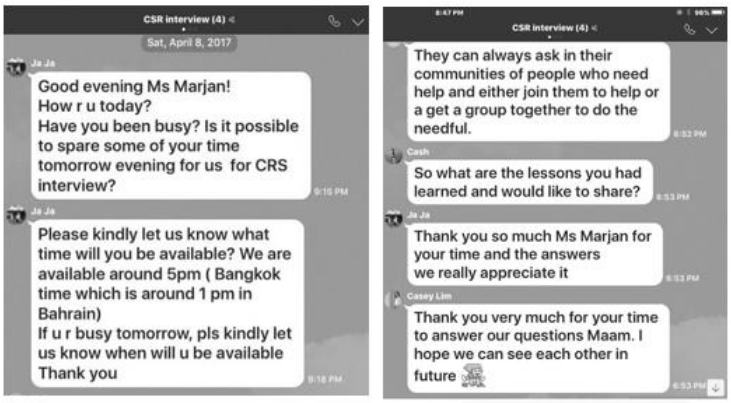


Figure 4.2: Evidence of regulatory learning in mCSCL in case 1

Source: Researcher's own composition

The act of getting together signified higher SRL behaviors and the desire to make the appointment showed that the students were aware of the task and objectives

of the discussion. Participants asked questions such as “What time do you prefer, LP1?” and “May I know what time will you be free on Monday?”. They even indicated time differences between countries to avoid miscommunication. This was illustrated when Participant C informed the interviewee “How about 5 PM in Bangkok and 1 PM in Bahrain? Would it be okay?” (Appendix 10). The texting also indicated good mannerism and consideration on the side of the students. Participant C said good night after the interaction (Appendix 10). On the day of the interview, participants took turn to ask and a total of 23 questions were posed in the 1 hour group interaction on 4th April 2017 (Appendix 10). The full process of the texting was on an individual level but the work and flow of the interaction were collaboratively and socially shared among all the participating members. With the completion of the group interview, the facilitator messaged each individual students to get the feedback of their ML experiences (Appendix 10).

On a whole, all 4 of the students were satisfied and contented with the learning despite one student expressing that “it did gave me a lot of confusion on our first online discussion because I can’t catch up with the flow” (Appendix 11). While Participant H felt that the learning meant a lot to her and “worth learning”, Participant C thought that meeting the interviewee in personal would be much better. Participant H however, realized the importance of the work done. Participant JJ who expressed some initial concern of confusion, later commented that “Now, I think I am already getting used to it and no more confusion” (Appendix 11). The facilitator praised Participant B for her braveness to ask questions because she was exceptional quiet in class. This sharing of learning experiences enabled better understanding on how students learnt and behaved in a ML environment. Participants became aware their

individual and collective roles in regulating learning to complete the task. The social regulation of learning continued when participants made a second round of texting on 17th April 2017 asking the interviewee for some photos which they needed to be placed in the final report and presentation (Appendix 10). All the students joined the texting and expressed appreciation to the interviewee for sharing knowledge. Again, the group communication was a good indication of the collaboration and SSRL as the students towards meeting learning requirement.

In preparation for the final report, each student presented a write up on their assessment of the learning (Appendix 14 -17). In this exercise, students reflected on their regulated learning with either a summary of what they had learned or how the learning had inspired them to be ethically responsible as a requirement of the course. Participant H felt motivated by the work of the interviewee remarked that "I believe that little by little, day by day, I can contribute to changing the world for better" (Appendix 15). Making reference to the collaborative nature of ML, the student opined that "through this tool, we can somehow collect knowledge from all over the world, know more people, understand them, and learn lessons from what they do" (Appendix 15). Apparently, students became much more imaginative. This SRL behavior was evident in the remarks by two students. Participant H reckoned that "imagine if in every corner in the world, there is an appearance of people like the interviewee's club members, how (much) better and greater our planet will be" (Appendix 15). Participant J affirmed that "most importantly, I also learnt that, as an individual, I could always be a miracle in other people's lives through simple actions such as talking to them, playing with them and helping them with their homework" (Appendix 17). As for Participant B, a relative quite student in class, saw ML as

"advantageous" (Appendix 16). For a chatty student like Participant C, she felt that interaction "could be in everywhere" and that learning was much more efficient when "attachments" could be made easier. These self-reflective reports by the four students in case 1 are presented in Appendix 14 to 17. During the presentation on 19th April, 2017, students were very excited to share their learning experiences. Note reading was not observed in the presentation. However, there were constant support by co-presenters when a member noticed some help was needed by another. This co-regulated behavior was clearly visible throughout the presentation. Each member provided the needed information when they saw the need to assist. At times, there was also the "adding in of information" as a way to enhance the presentation. One noticeable observation and reflection by the instructor was that the sense of knowing, the desire to share new knowledge, the eagerness to assist and support for team members and the relaxing mood in presentation were exhibited and the sensation from the presentation and performance was unlike usual class presentation. The unity and confidence of the team surfaced sharply in the eyes of the viewers. While the presentation was on-going, the facilitator posted 11 pictures and 1 video on the group Line. While the interviewee sent emoticon of thumb up to the group, each individual student returned with clapping hand and more love emoticons. The SRL was essential for success completion of the task as well as the presentation. Figure 4.3 shows some of the pictures posted on the group Line by the facilitator. The flow in the regulation of learning in case 1 is presented in Figure 4.4.

Figure 4.3: Students engaging in the presentation of their ML task (case 1 in 1st CAR)

Source: Researcher's own composition

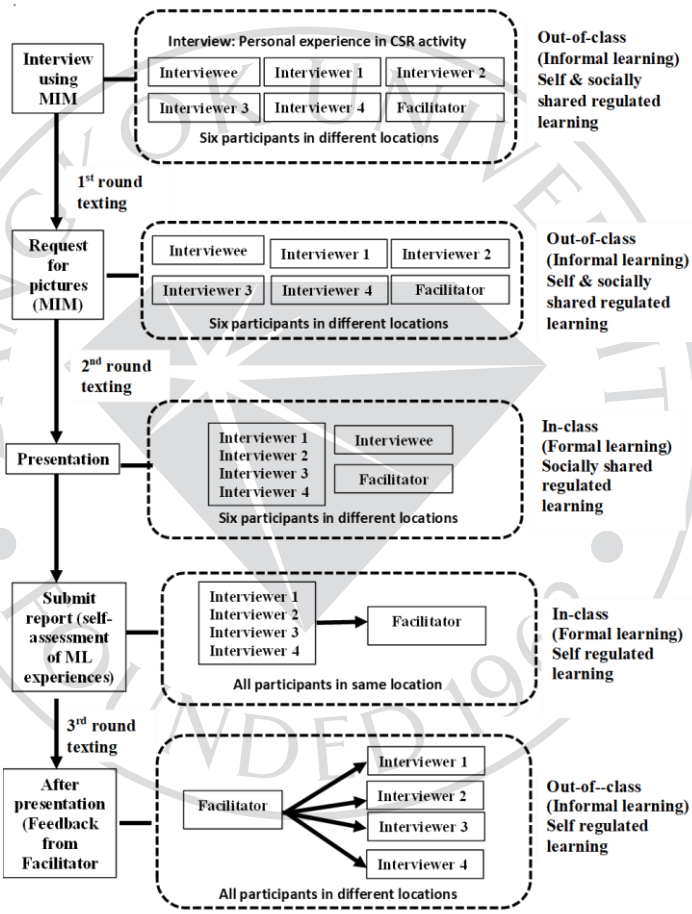


Figure 4.4: The flow of interaction of case study 1 in the 1st CAR mCSCL activity

Source: Researcher's own composition

4.2.2 Flow of regulation in learning for case 2 (1st CAR)

Unlike the first case, the regulation of learning in case 2 started with the team leader, Participant P starting the interaction with the interviewee. The SRL initiative led to the 4 discussion sessions from 13th April-17th April, 2017 with a total "text" discussion time of 1 hour and 10 minutes. The details of the interaction are presented in Appendix 12. In these discussions, Participant P asked a series of questions on the activities of the interviewee. A total of 10 questions were asked by the students. The several reply sessions was because LP2 was a busy working mother. When LP2 responded to the posted questions, Participant P agilely moved on to new questions. This reaction demonstrated the high level of SRL skills of the participant to reach the task objective. Her understanding and patience also indicated the determination to learn and gain insight understanding (Appendix12). The co-regulated learning efforts of the 2 participants were based on mutual understanding that time was a constraint and expected responses might be delayed. This was evident in the texting between the 2 parties with LP2 apologizing for the "late reply" and getting on quickly to the question "For question 1, ..". Participant P also exhibited good SRL behaviors expressing her appreciation in the ending statement stating that "Thank you so much for giving your time to interview for our project. Our project could not have done without you". Interestingly, the participant mentioned the task as "our project" signifying team spirit and acknowledging the task as group work. To allow the team to know what was said and shared, Participant P captured screens and posted all the texted messages to the group Line which included the course facilitator and this was when the co-sharing occurred. The co-sharing of information and learning by the student to the group Line are presented in Figure 4.5. The co-regulated

learning behaviors were displayed simultaneously to the other three team members. Participant I, another team member read the text and expressed thank for the transfer of learning.

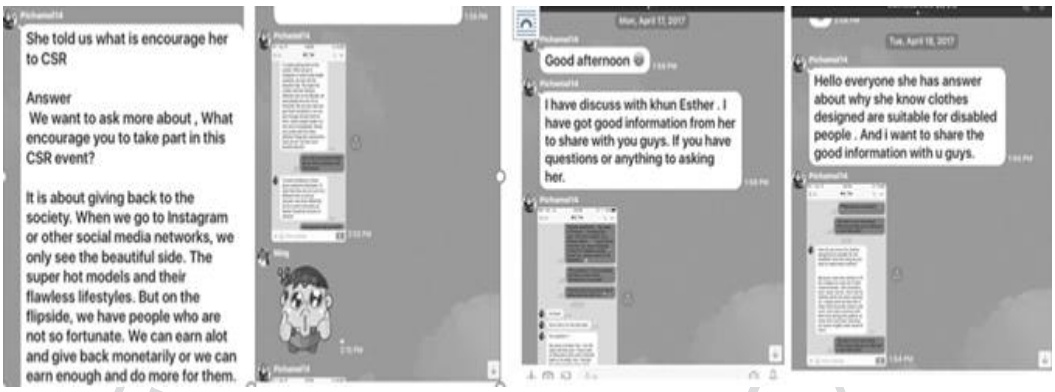


Figure 4.5: Evidence of interaction in group Line in case 2 (1st CAR)

Source: Researcher's own composition

When students co-regulated their learning, they were able to organized the information and prepared the presentation with links provided to them from their learning partner. Participant P remarked that "she gave us the website. I saw it and it was very interesting. We have already done our interview". The wordings of team leader, Participant P, reflected the integration of the self-regulated to co-regulated and from co-regulated to co-regulated and then from socially shared to self-regulated learning. The cyclical flow in the regulation based on the interaction and conversation analysis had been recorded and witnessed in case 2 of the first CAR. The pictures of the students' presentation in class are presented in Figure 4.6 and the evidence of interaction on the group Line is shown in Figure 4.7.

Figure 4.6: Students engaging in presenting their ML task (case 2, 1st CAR)

Source: Researcher's own composition

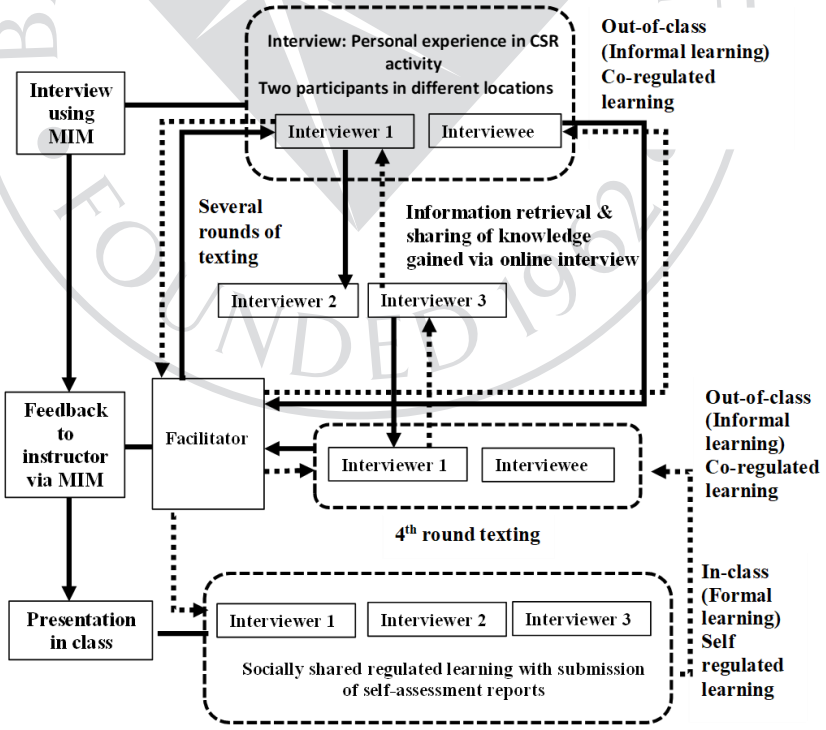


Figure 4.7: The flow of interaction of case study 2 in the 1st CAR mCSCL activity

Source: Researcher's own composition

4.2.3 Flow of regulation in learning for case 3

The regulation in learning in case 3 was quite different from that of case 1 and case 2. First, the number of questions asked were relatively fewer than case 1. The completed texted messages of the group is presented in Appendix 15. The evidence of the interaction on group Line is depicted in Figure 4.8. As compared to case 1, only 12 questions were posed in the interaction. However, the distinction in this conversation was that the external learning partner actually asked equally same number of questions (12 questions) to the students as a gauge of their understanding.

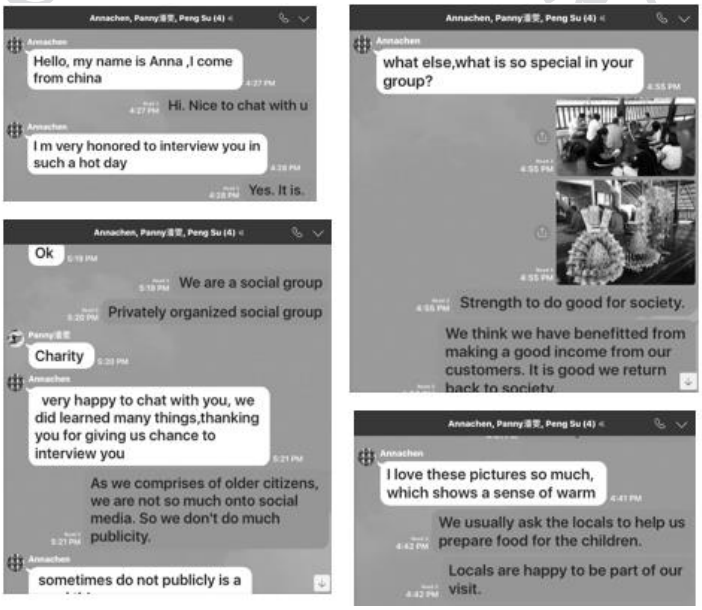


Figure 4.8: Evidence of interaction in group Line for case 3 (1st CAR)

Source: Researcher's own composition

In this co-regulatory activity, participants' self-regulated learning were assisted by the reflective questioning of the capable other to encourage students to engage in critical thinking. This observation was evident in the following interaction between the participants and the external learning partner (LP3).

"We also found out something during these few years of CSR with schools. Can you make a guess what we have discovered?" (Qn.E)

"We think we have benefited from making a good income from our customers. It is good we return back to society. What do you think? (Qn.G)

You are from a business school right! Do you agree? (Qn.H)"

By way of questioning, the external other shared greater responsibility in the regulation of the learning, and allowing the students to focus more on the task enactment. This in turns, supported the metacognitive engagement and regulatory control of students. Students began to metacognitively monitored, evaluated, and regulated learning tasks and process the understanding. Hence, the collective monitoring and learning process leveraged the metacognitive and motivational knowledge and optimized learning. The responses of the student in case 3 backup this observation. The student claimed that she 'understood completely' and was astonished, acclaiming that "Wow! I think we all should learn from your group."

The interaction was in fact observed by three students but 2 remained quiet and 'read' the text as they were sent. The SSRL was actually dominated by the interaction between the interviewee and one student. It was more of a co-regulated learning experience in a socially shared learning context. The students in case 3 were able to relate the working experiences of the interviewee with the pictures shared to them. The presentation as shown in Figure 4.9 was neatly presented with their shared understanding. The regulatory flow of the learning is illustrated in Figure 4.10.

Figure 4.9: Students engaging in the presentation of their ML task (case 3 in 1st CAR)

Source: Researcher's own composition

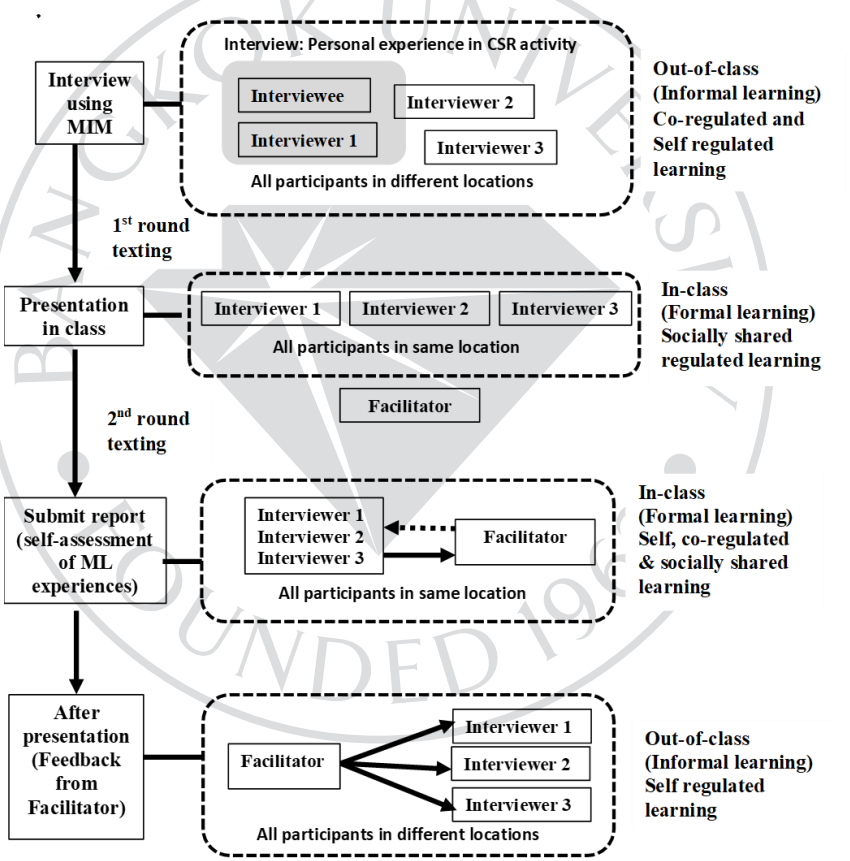


Figure 4.10: Flow of interaction of case study 3 (1st CAR)

Source: Researcher's own composition

4.3 Findings of 2nd Classroom Action Research

The data from the second CAR was based on 21 participating students' ML activities and their learning experiences in the course. Students related their cross boundary learning through their self-reflective reports. The Excel Spreadsheet program was used to do the First and Second Coding along with the reflective learning by the researcher. The First and Second order coding of the 2nd CAR are presented in Appendix 18 - 38. The self-assessment of the students provided strong evidences supporting the new knowledge co-creation processes in the ML environment.

4.3.1 Personal and Social Knowledge Gaps

More than half of the participants in the class (11) felt that their understanding of the subject matter was "still very shallow" (Appendix 34). This highlighted the wide personal and social knowledge gaps that prevailed among the participants in the class. These students claimed that much of their prior knowledge on the subject were from the social media as pointed out by P3 that "my impression or my imagination of the subject came actually from my reading and viewing based on the social media" (Appendix 20). Yet as voiced out by P12, "although there are many information on the subject, these are mainly facts and figures" and "there is little written on how people are affected by the changes in their societies" (Appendix 29). The construction of knowledge was thus necessary when information was limited and had real world relevance.

Sharing the same concern, P17 also disclosed that "I don't remember much fact because there are simply too many things one needed to know about Asean" (Appendix 34). Remembering was the lowest level of learning in the cognitive domain

of the Bloom's Taxonomy and typically did not bring about a change in behavior. It involved memorization and recollection of information with no evidence of understanding. These statements, therefore demonstrated supporting evidences that participants were aware that facts and figures could only help to reproduce and not constructing new knowledge.

Two participants (P5 and P12) related their daily encounters with P5 stating that "being with some of my Asian friends from my university also let me experienced the way they think, act and behave" (Appendix 22 and Appendix 29). However, these encounters as perceived by P8 could only enabled her "to visualize and imaging what the subject was like" but her understanding was "still limited" (Appendix 25). This inadequacy in understanding was pointed out by another student (P11) saying that "although there were 21 students in the class, surprisingly only a handful actually travelled and had some degree of exposure on the way of living and working" (Appendix 28).

For participants with certain degree of exposure and possessed relevant prior knowledge were able to reflect on their own experiences and used personal knowledge to share opinions on the subject matters. P2 reckoned that "my personal experience living in Thailand tells me that it really takes time to adapt and adjust to this society" (Appendix 19). For P3, this personal knowledge allowed her to make comparison as she related her experiences when saying "studying in Thailand for 3 years, I see that the lifestyle and working attitude of the Thai people are very different from the Chinese" (Appendix 20). Table 4.1 illustrates the comments made by students with regards to personal and social gaps in understanding.

P14 believed that “to fully understand the way of life of the Asians is not an easy task” (Appendix 31). Rationalizing the lack of understanding, 5 students (P2, P3, P4, P6, P10), specifically mentioned that their lack of knowledge were due to the limited social and physical contacts and little exposure to the subject matters. P10 expressed her apprehension revealing that “I have yet the chance to travel to all these countries” (Appendix 27). Even if trips were made, P13 reckoned that “they were short and not unable to truly understand how it was like living and working in these countries” (Appendix 30).

Table 4.1: Personal and social gaps in understanding among students

Student	**Knowledge Gaps**
P1	My understanding of the (subject) is still restricted.
P2	I have limited exposure to (subject).
P3	I have no idea what it is like living in the (subject) countries.
P4	I have limited contact with (topic) except Thailand. I don't know what it's like to live in these countries.
P6	I have no idea what it is like living in these countries. My impression or my imagination comes mainly from reading and viewing based on social media.
P8	Although from social media and social channels, I am able to visualize and image what (subject) is like but my understanding is limited
P9	I think it is not something you can find in the internet because it’s about everyone experiences and if we don’t ask we simply can't get access to the information.
P10	I have yet the chance to travel to all these (subject) countries to experience what living and working life is like in this region.
P13	I am unable to truly understand how it is like living and working in these countries.
P17	I have little knowledge about how life is like in (subject). I must admit my understanding is still very shallow.
P18	These interviews let me understand the experiences that are not known to me.

Source: Researcher’s own composition

4.3.2 Receptive to mobile and social learning

There was clear indication that students were open and positive towards ML approaches. Many (19) were excited and interested to engage in

the task. Students were able to differentiate traditional and innovative learning approaches citing that the ML task was unlike any of the other assignments because "it is real sense making of the way people live and work where we do not have the chance to expose to" (P1). Students were aware of the task purpose with one student (P14) citing that "The task is to make use of our mobile applications to contact and connect the participants at no cost" and P18 added that the interaction would allow him to understand how people lived and worked in Asean countries and that "these interviews let me understand the experiences that are not known to me" (Appendix 35). ML was perceived as a "new form of learning" by P2 who cited that while "most of the coursework are done without having to contact people or in real situation, this learning with mobile is really exciting because I have no idea but to expect and how I would respond" (Appendix 19). These remarks showed that learning using mobile devices made learning more interesting and authentic. This curiosity drove students to "explore beyond what I know" as claimed by P2 (Appendix 19). The benefits of engaging in authentic ML activity was reinforced by P20 observation that "actually, the teacher in this class did not want us to just read through the books, she wanted us to experience by our own self (Appendix 37). It's more fun to have this kind of class that let us experience outside world" (Appendix 35). For other students, this assignment came with surprises. P21 made reference on knowledge acquisition in authentic context believing that ML had positive effects on knowledge acquisition claiming that "if I haven't got the chance to talk, I think my understanding would be very shallow" (Appendix 38). This feedback was important as it highlighted that learning with technology did not imply just making learning activities digital, but also to create contexts for authentic learning that integrated mobile technologies into

meaningful ways to improve knowledge production and the interaction for the dissemination of ideas and information.

ML was also fun learning as stated by P4 and P20 (Appendix 21 and Appendix 37). The concept of fun learning came with less stress as cited by P4 that "I don't have much pressure but I need to learn with understanding" and this understanding derived from "talking to different people" (P20). P14 also added that the task was easy and 'Sannook' because of "the ease of communicating and familiarity of using mobiles to texting and calling" (Appendix 31). These statements were noteworthy as they signified the changing mindsets of students towards learning. These mindsets contained both cognitive and emotional elements. Students enjoyed the pressure-free learning technique which allowed deeper 'understanding'. Suggested by P17 "studying can be an interesting thing. We not only chat with others, but also get knowledge from that" (Appendix 34). Students were also able to integrate their mobile devices such as the tablet in a meaningful manner to allow deeper learning to take place. This new learning culture was mentioned by P1 that "I had never seriously thought 'texting' could be educational" (Appendix 18).

P1 also added that doing an assignment using the mobiles devices was "different and should not be difficult because texting is commonly used". The familiarization in using new learning tools such as text, illustration, and audio and visual recordings, provided students the chance to have smooth learning experiences. As indicated by P8, "learning with my mobile has enabled me to interact easily ….. I didn't expect I would be able to obtain this information …. I see the benefits of this learning" (Appendix 25). This was a good example of student seeing the added value of mobile as an effective learning tool.

More significantly, these reflections indicated the process of coming to know through mobile interaction in social learning. The implications towards the construction of knowledge - know what, know how, know why were the starting points of how students engaged in the construction of new knowledge instead of "copying all from book" as voiced by P20 (Appendix 37). This sense of activeness in learning was reflected by one of the students (P13) that "this assignment made me more outward in searching for the information I needed" (Appendix 30). As the content of the learning deepened and became complex, it required greater cognitive procession of the students. This evidence was supported by P9 statement that "it is not something you can find in the internet because it is about each and everyone experiences and if we don't ask we simply can't get access of the information" (Appendix 26).

Hence, the ML activity reframed students' perception of working on assignments. The need to know drove students to think further and asked more questions to understand how socializations could enhance the learning process and motivate them to engage. To access this information, learning across community was needed. This supported the concept of learning boundaries and that these boundaries fostered interlinkage between the formal knowledge in the academy and the informal work process knowledge in the practical world (Akkerman & Bruining, 2016).

4.3.3 Cross boundary learning

The concept of cross boundary learning emerged as an important component of ML when P4 pointed out that "on using my mobile to help me to learn, I think it opens up the classroom space" (Appendix 21). The opening up of the classroom space signified the expansion of the learning boundaries. A number

of students (5) brought up the concept of boundary crossing with P6 citing that "This class project actually allows me to overcome the geographical barriers to understand someone far from me" (Appendix 23). Two students (P3, P4) explicitly mentioned the keywords crossing the "physical and space boundary" for learning and understanding. Supporting this learning method, P17 opined that "I think one of the easiest way is to talk with the Asean people to hear directly from them how life is like for them at work and in daily living" (Appendix 34). This approach to learning was made possible as suggested by P4 that "technology has made my learning more productive and I am confident to talk about my work" (Appendix 21). P2 also used the metaphor of 'step-out' and 'step-in' o associate with the boundary mechanism in learning space when she said that "this class project actually allowed me to 'step-out' of my physical restriction and 'step-in' to the virtual space to understand someone far" (Appendix 19). The cross boundary learning task was thought to be "an interesting method to gather information" (P5). It was said to be an "extensive learning method" as suggested by P15. The extensity or geographical coverage of the learning implied that the learning was beyond the curriculum (Appendix 32).

The interaction had noteworthy impacts. Not only did it influenced the learning strategy (P5, Appendix 22), it also made it "possible to get the insight of how people live and work" (P8, Appendix 25). Considered by P9 as a "good way to learn" (Appendix 26), the interaction improved students' understanding quite substantially (P8). Students realized that "the societies they lived in were actually very different" (P8). On the dynamism of ML via interaction, P15 was amazed that "without crossing to these countries, we are able to socialize with people to gain information that it is not possible if we do not have mobile as a tool to learn" (Appendix 32). It was noted

that P5 looked beyond the functionality and economy of the mobile apps but focused on the fact that "I just needed to try to communicate the best when I texted and talked to them" (Appendix 22). These statements were good supporting evidences of the usefulness of social learning in the ML context.

Almost all of the students who had embraced the technology were not afraid to proceed with the interactive tasks. One of the student, P5, asserted that she did not feel the stress of the learning. Their sense of ease was illustrated by the use of term 'wave and chat' or 'wave and hello'. A handful of students (P1, P2, P4 and P6) felt that using mobile was 'an effective way to wave' to individuals who could share their experiences with them. According to P1, in return for the exchange of information from 'friends', "investing one's time was acceptable". Interestingly, learning partners were viewed as 'friends' and students felt confident to communicate. This was vivid when P10 felt that she was fortunate to "have my mobile and a list of friends on my social network" (Appendix 27).

Another significant impact of social mobile interaction mentioned by P5 was that the medium was appropriate for the task. P5 felt that "mobile phone interview from different countries was a good activity" giving her the opportunity to know people better and would continue to communicate with them online to have deeper understanding in the future. In other words, students were enthusiastic about the online interaction experience and saw the advantage of the networking.

4.3.4 Identification in cross-boundary mechanism

Identifying the right person to assist for knowledge sharing was seen as a challenging task by a handful of students (P10, Appendix 27). This identification process included three elements which were mentioned by P1 as

reaching out to, interacting with and connecting to the experiences of the right people. The identification process signaled higher student engagement and active learning. This pro-activeness was shown in the remark by P15 that "before I did the interview, I had to identify who I could talk to and how I should approach them" (Appendix 32). It was a exploration task as described by P2 and P5. This task was crucial as pointed out by P9 that it required "one to make careful decision to whom one could ask for help" for "it would help you to score well" (Appendix 26). This thought showed that mobile connectivity could improve collaboration via real-time or instant interactivity that might lead to better decision making. Self-efficacy was also witnessed when P13 made specific reference to selection criteria for learning participants. P13 emphasized that "I must select the right person to text to. My criteria of participants are ….." (Appendix 30). The standard setting showed higher self-efficacy of the students to plan for their learning.

The identification process had a profound impact on the learning outcomes. The desire to locate the right person was evident when P10 revealed that "Tracing my list was not easy. I have to filter to get the suitable candidates to approach for the interview" (Appendix 27). There was effort made by student as told by P2 that "I began to trace back some of my friends whom I had not spoken for a long time" (Appendix 19). The identification process had been taken seriously by students as they started to advent the task. It was also opportunity to be re-connected with former friends whom they had not spoken 'for a long time'. It was a time for re-bonding as students proceeded with the assignment.

Although most of the students were receptive to the use of mobile in learning and understood the mechanism of social learning, a handful was concerned over the

dissemination of knowledge from external sources. As put forth by P5 that "I wasn't sure how much information would they share with me especially they didn't know me to talk something personal" (Appendix 22). There was also worry expressed by P10 that she had "no idea if I was able to do that" (Appendix 27). Trust was a critical element of social relationships. What one did with the shared data made a big impact on the flow of knowledge across communities (Shelley, 2017). As Facebook recently discovered with the Cambridge Analytical issue, if one acted inappropriately there could be significant tangible and intangible impacts for all in the community.

4.3.5 Co-ordination in cross-boundary mechanism

Co-ordination advanced as students and their external learning partners identified effective ways to enable better co-operation. One of the student (P8) remarked that "talking allows me to ask more questions and some of the information are not available in text or classroom learning materials" (Appendix 25). The willingness of the external learning partners was crucial. There were consistent evidence from P5, P8, P9, P10, P11, P14 and P15 that good explanation of the purpose of the interaction helped and facilitated the flow of the conversation. P11 shared her experiences citing that participants were "happy to share their knowledge when we explained the purpose of our mission" (Appendix 28). To create a friendly impression, P11 commented that "When I talked to them, I tried to make our conversation look (sound) funny and not too serious, but I still had a good sense of humor" (Appendix 28). This was a good evidence showing that student adapted to the situation and tried to create lively atmosphere to encourage interaction. This learning behavior was self-regulated through the reflection of students which would lead to

internalization whereby they could apply the new information and knowledge gained in the learning activities.

Interestingly, as observed, the co-operation between the two parties become more mutual with the out-of-school boundary-partners eventually took a greater role in the collaboration efforts. The following conversation illustrated this shift in learning and sharing roles of the two parties. The sequential conversation showed active response of the interviewee to meet the request of the student with the intention not only to assist in the completion of the task but also in helping the student to improve in her English language ability. The conversation is as follow:

Interviewee: Nice to meet you. I'm working. How about you? What's your major?

Student: My major is Business English. What are you doing?

Interviewee: Wow! Do you like it? I'm having my lunch now. How about you?

Student: Yes. I want to improve my English. I'm studying now. Could you help me to do an interview on your living life and working experience in your country? This is for my project in ASEAN class at university.

Interviewee: Hello, I'm so sorry for the late reply. Sure! I'd love to help you. When are you going to pass the project? And I can teach you English too.

4.3.6 Reflection in cross-boundary mechanism

The socializing context embedded the everyday learning situation and learning informally (Fronhberg et al., 2009, p.8). This highlighted that learning was not just researching for information but understanding from different angles, perspectives and contexts. The feedback from the interaction was generally positive. The social interaction promoted active learning as suggested by PI that "the

conversation got me to think a lot more" (Appendix 18). Reflecting on her learning, P8 made a trivial statement that "I realized that when I talked to my interviewee, I was also listening much carefully" (Appendix 25). The act of careful listening was an indication to the presence of metacognitive skills in the absorption and analyzation of information for deeper understanding.

The remark by P17 that "I also got many new things and knew something different from my mind" was interesting as it indicated the cognitive awareness of new learning taking place (Appendix 34). This social learning was regarded as "a really important experience" by P17. Reflecting on the depth of her understanding, P17 claimed that "before I studied this subject, I only knew Malaysia was famous for Twin Towers. But now, I learnt more about Malaysia from the class" (Appendix 34). The reflection process in the cross-boundary mechanism was clearly indicated in the remark made by P3 when she urged that "now, I realized that just through books and network are not enough to really understand the Asian countries. So, through the people (from Asean) to understand their really lifestyle is necessary" (Appendix 20). She (P3) affirmed that via social learning, "we have learned a lot of things and we could also make many friends".

Besides perspective taking, students were also developing new perspectives from the interactions. This was evidently reflected in the feedback of one of the student (P14) when she commented on the aspects of culture and standard of living in Asean. These statements are as follow:

> "Different countries have different cultures and different religious beliefs and they are difficult to integrate into another culture." (P4)

> "From the interviews, I have also realized that there is also a difference in the standard of life among the people in different countries of Asean." (P4)

Other evidences supporting the formation of new perspective included the observation made by P12 and P2. Commenting on the living and working styles, P12 clearly stated the differences in economic development among the countries and how these developments influenced the mindsets of the people towards their life and work (Appendix 29).

> "Asean as a region is growing. But each of the 10 nations developed at different rates and they have different work attitudes and expectation. The richer countries stress more on the quality of work and living while the fast-growing countries work hard and have strong hope for better life. People in the weaker economy country still struggled with the thought of getting more work to survive. Asean is a colorful region with many diverse ways of life and types of work opportunities." (P12)

Reflecting on her understanding of ethnic differences, P2 reckoned that "when considering Asean as a region with not just Chinese but Malay, Indians and other ethnic groups, living in this part of the world become complicated" (Appendix 19). These reflections provided evidence supporting the new perspective formation in social learning. Students with refined or new perspective showed better ability to comprehend different elements in society towards a more coherent understanding of people and society. These discourses supported deeper learning. Apparently, through conversation, students went through the learning process of experiencing, reflecting, conceptualizing, and acting to create new experiences.

On the topic of making-friends, the socializing context comprised of a wider scope included sharing of learning and the interpersonal relationship. This was unlike the formal classroom context, socialization placed emphasis on the community of learners acting as mutual peer coaches to exchange and reflect on their everyday situation for learning purposes.

4.3.7 Transformation in cross-boundary mechanism

According to P10, despite having several lectures, the interactions gave “new learning” providing a “bigger picture of Asean” (Appendix 27). The understanding enabled students to envisage diversity such as the “huge gap in income” among the different countries (P10). As for P9, the metaphor of a lighted giant house from an external or outside view was used to associate with the transformation of learning. Each individual interviewed from a country was represented by the opening of windows in a giant house. The description by P9 is as follows:

> “I needed to open more windows to light the house. Having more windows is like replacing the surrounding walls with glass panels and you think you see the house much bigger when looking from outside” (Appendix 26).

The metaphor of the giant house implied the bulk of knowledge and the breaking down of walls reflected the innovative learning methods in exploring, understanding and constructing new knowledge from new dimensions. To describe the assimilate and organization of knowledge, the metaphor of boutique of flowers was used by P9 (Appendix 26). The quote is as follows:

> "It is just like you try to decorate a boutique of flowers. If we only have one kind of flower than it will not be colorful. But if we can find many types of flowers, the art of arranging the flower will make it lively." (P9)

This metaphor of flowers was symbolic as it illustrated the progressive impact of mobile collaborative learning on new knowledge co-creation process. The self-reflection of P21 on her mobile interaction provided good evidence supporting this process. The remarks of her reaction to mCSCL learning is as follows:

> "These buses look clean and in good condition. These bus serveries are linked to Mass Rapid Transit system or MRT. Traveling in public system is economical and efficient. Owning a car is much difficult. That probably explained why Mr. Hilmi preferred to take buses to work and only used his car on the weekends." (P21, Appendix 28)

The demonstration of higher capacity to construct new knowledge was enabled by the availability of direct access to the Internet. This in turns, generated value added to the collaboration and motivated students to expand their learning. Worth mentioning was the comparison P21 made with the knowledge that she had acquired. She further her thought citing that "This conversation with Hilmi is interesting. I think traveling in Singapore is not difficult. Taking buses to work is common. In Thailand, where I am now, traveling by bus is not the preferred way. This shows the progress and economic development in Asean countries. In the future, we will see more and better transportation in Asean countries" (Appendix 38). The transformation via the cross boundary mechanism not only enabled the establishment of new perspectives but allowed students to made assessment of what future trend would be like. This cognitive ability to assess learning was crucial in our

understanding of the regulation of learning. The student was able to connect herself to the content that she had created with her external learning partner and this new learning had somehow compelled her to integrate outside environment with the world she was in. This demonstrated how mobiles acted as the enabling tools to facilitate the co-creation of new knowledge and meeting learning objectives.

4.3.8 Self-regulated learning

The findings based on the reflections of the students had provided sufficient evidences supporting mobiles as metacognitive tools for learners. Knowledge and SRL skills could be seen as the precursor to ML as presented by P5 that "my performance will be based on my understanding and how well I cooperated with my friends to make my learning meaningful" (Appendix 22). The linkage to better performance was reflected by the active involvement of the students towards the task. In the words of P4, "when I received the information, I have to read carefully so I could write a report that have my opinions. I have to write this report based on my understanding" (Appendix 21). Learning navigating skill had been mentioned by P15 citing that "by listening to more stories, I desired to work more on it for better understanding as well as performance of the assignment" (Appendix 32).

SRL with the support of external learning partners and peers, enabled the students to integrate information from different sources to create student-generated contents. The positive learning experiences of the students as seen in the desire of the student to "work more on it" also fostered trusting partnership that resulted in positive gains was reflected in P15 remark that "I can use it to form my personal impression of what Asean is about" (Appendix 32). Subsequently, this would lead to the construction of new knowledge, as was observed in many of the interactions in this

research. Thus, the proactive, self-organizing, and self-regulating behaviors were important indicators supporting the fact that the students made personal effort to improve their abilities to learn through selective use of metacognitive and motivational strategies. If the "do not make effort" behavior prevailed as suggested by P12, then "it would not be able to complete the work" (Appendix 29). Evidently, when P13 reported that "to help me to ask question, I participated in class to develop a list of possible questions that I could ask when I interviewed my social friends", this showed that the student proactively selected, organized, and created advantageous learning environment. Students played a significant role in choosing the type and amount of information they needed. As descripted by P6 "I set three areas where I wanted the information. The questions that aimed to find out …." (Appendix 23).

Students also looked into various affecting factors that might hinder the task and anticipated barriers for better time management and greater control in learning. These SRL behaviors were illustrated in P10's remark that "It took some time for me to choose the participants and ask them when they have the time to do the interview with me, also later I spent time on the interaction with my friends to get more information" (Appendix 27). The driving force towards stronger SRL behavior laid in the students' motivation to pursue further on the "discovered" topics from the interaction. The inquisitive nature of the students encouraged them to dive into the topic on the search engine. This phenomenon was reflected on the report of P11that "when I got their information, there were many topics that I was surprised. And it made me want to study a lot about Asean" (Appendix 28). Being engaged in inquiry cognitive activities made ML effective. This aspect of SRL behavior was clearly exhibited when P5 shared her learning experiences saying that "as I continued with

my search online, I also found that aging was a surfacing problem in some of the Asean countries such as Singapore and Thailand. I found a very interesting statistic on Asean aging population trend. I looked into the details of the population ….." (Appendix 22). This behavior indicated that the student felt committed to create new understanding and knowledge of the topic of interest. Most of the students were able, ready and willing to prepare, execute, and complete learning independently.

This was affirmed by the following statement made by P9 that "if we only based on the texting, the information might not be enough. So, we needed to zoom in and did additional research to add on to our knowledge. But if we started to paste each and more experiences of the people, we could see some form of patterns to make us see the bigger picture" (Appendix 26). P5 also confirmed this observation stating that "I found that from the chatting, my interviewees said something interesting and I could just use the concept that they introduced to me and connected to the internet for more information and the knowledge gained expanded" (Appendix 22).

As students engaged in the ML activities, they were not just task oriented but also became time-conscious in the learning process. Students' time management experiences differed. While P8 stated that "in a short time period, my mobile applications let me talk to people at no cost in 3 countries", P12 critiqued that "I used a lot of time to organizing with my task". P10 also mentioned about her experience added that "we were given three weeks to complete the task. It was not easy because respondents took time to add me in and finding time to chat" (Appendix 27). However, as the task progressed, students showing greater SRL skills made more effort to improve on their learning activities. This phenomenon was highlighted by the experience of P20 citing that "I spent months to finish the following part because I

didn't just interview once. I continued to keep in touch with them and that's why it took some time to finish" (Appendix 37). In this case, when students became reflective about the teaching and learning process, they also strengthened their capacity to learn.

In the process of being actively engaged in the learning process, students too set their performance goals. This was evident in P6 self-observation that "I see myself better organized and eager to see the outcome of my report" (Appendix 23). By identifying her learning goals, she was able to close the gap between her current and expected performance. She was motivated to re-assess her knowledge, and this was reflected in her follow-up calls to her participants. This effort provided the evidence of products out of operation. Students developed positive expectation of the outcomes.

Another critical observation of the findings indicated that students who exhibited strong SRL skills had the tendency to display a high level of motivation. This observation was supported by P5 remark that "to make sure that I do better with more help, I approached my teacher and asked for assistance as to how I could improve my work and my teacher suggested me to put pictures to help the reader to understand what I wished to present and share". P5 further cited that "I asked my teacher who had a good chat interview and my teacher recommended me some" (Appendix 22). The desire to perform better denoted co-regulated learning behaviors.

4.3.9 Co-regulated learning

The collaborative nature of the ML activities was reflected in the words of P1 citing that "In this assignment, I have learned to work with people in and outside of my classroom" (Appendix 18). It was considered "a good way to learn and learning is both collective and individual" (P9). Co-regulation in learning

also created a new learning culture. Students were able to distinguish a change in the class atmosphere where co-regulated learning occurred. This variation was described by P10 that “very different from our weekly class session. We talked for the first time among ourselves and we try to figure our thinking using the information we gathered” (Appendix 27). This was a good indication of making plans to reach the learning goals. The social impact of the collaboration was distinctively depicted by P10 claiming that “It was very noisy in class but we managed in the end to get answers that we could use for our efforts” (Appendix 26). The ability of the students to articulate to each other enhanced the knowledge sharing process thereby transforming the classroom into a 'noisy' learning space where the new interactive learning culture emerged. Student actively involved in the knowledge sharing process with collaboration, reflection, and articulation.

This was a useful approach to engage student in introductory authentic task. The degree of activeness signified the important understanding of how, what, when and why to use the communication tools in the knowledge management processes. As P21 put forth that “If I haven't got the chance to talk, I think my understanding is very shallow” (Appendix 38). The pictures presented on Figure 4.11, were taken in the class discussion session where students brainstormed to develop a list of questions to assist them in the mobile interviews which was the task they were assigned to do on an individual level.

Figure 4.11: Brainstorming session prior to the mobile learning task
Source: Researcher's own composition

These social experiences had an impact on cognition. Collaborative learning motivated students in their self-regulated effort to learning. This experience was put forth by P13 when she said "You know you are doing an individual assignment but you also know teacher and classmates can also help you" (Appendix 30). The students collaboratively work on solving possible problems of the task. The opportunity of interaction between peers had the potential to create a Zone of Proximal Development (ZPD) as suggested by Vygotsky (1978 p.86). ZPD referred to the distance between the learner's current knowledge or "actual development level" and the desired level of development or performance that happens with the assistance from the more capable peer(s).

The list of developed questions as suggested by P13 was a "useful guide" that helped her to "cover areas she needed to focus". What was important was that "everyone in class tried to give some suggestions and we developed the list rather

easily". To the students, this sharing "added to her understanding" (P13). Students saw the benefits of co-creating the interviewing questions so that "my participants can have a convenient and smooth understand what I needed to ask" (Appendix 30). Being ready and prepared, the outcome was satisfactory as P18 had experienced. P18 reckoned that "When I asked them, they were happy to help me" (Appendix 35). Thus, the emergent interaction within a zone of proximal development supported Panadero & Järvelä, (2015, p. 191) proposition that this interactive phase was an important step in a student's progress toward self-regulation in learning.

Relating her experience of her ML task, P14 cited that "initially, in the interview, I asked a list of prepared questions. But then, I realized that he (learning partner) was driving". She expressed her concern and asked if it was alright for him to continue the conversation. Fortunately, with the driver had his on and the sharing was made possible. P14 demonstrated her SRL skills further by cutting short her questions with just one simple question. She asked "Have you ever being to Thailand and how is Thailand different from Singapore?" (Appendix 31). With this question, P14 allowed her participant to speak freely. Worth noting in this instance, was that P14 upon knowing that her participant needed to focus on the road, cut short the video call and transferred the task to Facebook Messenger video call and voice call and proceeded from there onward. This case example was interesting as it showed high degree of flexibility that prevailed in the execution of the task. The situation had forced the student to be adaptive in order to make it easier for the participant to effectively assist her via constructive conversation. The co-regulated learning in actual fact generated positive effects on SRL of the student. Evidently, self-regulatory behaviors are "highly context dependent (Zimmerman and Schunk, 2001, p. 125). The

photos presented in Figure 4.12 shows the interaction that took place between the student (P14) and her participant.

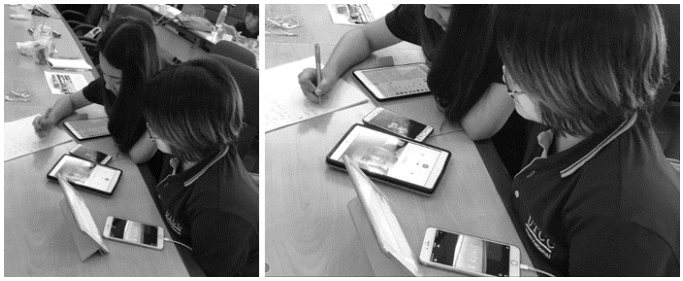


Figure 4.12: Interviewing in progress between students and participant
Source: Researcher's own composition

The satisfaction in the interaction was reflected when P14 felt that "I think I am lucky to get to chat with very friendly people in the project. My participants were patient to answer my list of questions" (Appendix 31). This sensation in learning drove the student to take further learning actions with her search on the company of the participant whom interacted with her. She did a "search about YK Ship" and made a detailed report on what the company was about and the success factors of the company. The "dive for details" was significant indicator of the metacognitive learning process of the student. This enabled students to co-create new ideas and enhanced on the quality of the learning based on social interaction. The impact and influence of social learning on the regulation of learning were strongly reflected in this specific case.

Two other worth mentioning cases of the students (P19 and P21) were significant in terms of new knowledge co-creation in mCSCL environment. "My interview with Mrs. Gin was an interesting one" as pointed out by P19. The discussion was on the quality of life and how the participant maintained that standard of living.

The participant briefly mentioned about the social security programs that allowed people to live better in Singapore. The participant also revealed that she received incentives from the government for having more children. Apparently, P19 had no idea what these programs were about. It was interesting and she decided to search the internet to find out what and how the fund worked for the mother of three. Hence, this new source of information led to further search for understanding. In her effort to gather more information, P19 searched the internet and read an article entitled 'Tackling Singapore's baby shortage', an article published online on February 14, 2016 by Straits Times written by Pearl Lee. From the article, P19 was able to do a summary and came up with a conclusion that indicated the increased level of empathy towards the living experiences of her participant.

With the capacity to understand her participant, P19 was able to feel what other people were experiencing from her own frame of reference. This degree of empathy was reflected in her excitement citing that "I discover that Singapore has a low birthrate of below 1.4. This means that an average Singapore woman will has one or no more than two children. This rate is below the replacement rate of 2.1 to maintain population levels. To encourage people to give birth, the government gave cash grants and subsidies. There was also more flexibility at work to assist young mothers. These changed work culture in Singapore. P19 was able to associate social benefits to the cultural aspect of living and working in a country new to her. This evident as presented in Appendix 38 was crucial as it suggested that co-regulatory exchanges foster individual metacognitive processes. The ability of the students to navigate within an information rich world was an important skill and this reflected the flexibility in the management of knowledge. The ML designed activity highlighted

learners could gain immediate and ongoing access to information, peers and experts (not necessarily teachers) who can help them determine the relevance and importance of information found on both the internet and in their real-world environments. P19 ability to search, interpret and integrate her learning into new co-created knowledge highlighted her high sense of efficacy in her capability to complete her learning task. Undoubtedly, the use of multimedia information enhanced cognition and heightened students' learning motivation. Students' motivation was considered the most powerful predictor of academic performance (Pintrich and Schunk, 2002).

The learning experience of P20 might be an extreme case. P20 managed to contact her participant from Indonesia via Facebook Messenger. To her "it was an easy way to talk and share social experiences". The conversation dated 21st September 2017, lasted 3 hours. The conversation with her Indonesian participant had an impact on her. This conversation had fascinated P20 who decided to take to trip to Indonesia to meet her participant and experience living in Bali. There was also distinctive effort made by the student through follow-up calls. She was keen to find out new changes in their life. P20 found out that "unfortunately, Harry lost his job. But, he is looking for a new job now. Meanwhile, he becomes an Uber driver" (Appendix 37). This case reinforced the idea that SRL not only reinforced engagement but motivated learners to get into action for greater learning experiences within the social and cross-boundary context. This could be seen as a strategic action (choosing the best strategy depending on the situation) based on the cognitive thinking and behaviors of the learner. As mentioned, this was a single case, it might be an indicator of change and challenges in the facilitation of knowledge and tasks within the 21st century classrooms. From the learner-centered prospective, there is a need to rethink about how the new curriculum

could be tied to the social emotions experienced in the collaborative ML environment. This is especially so, when students begin to take control and making independent decisions in their learning sphere.

4.3.10 Socially-shared regulated learning

To facilitate the regulation of socially shared learning, the instructor integrated in-class support requesting the students to work together on their findings to generate a shared understanding and greater social learning exposure. They were encouraged to share their social interaction and learning by discussing their findings with an evaluation of similarities and differences among countries. In the process of discussion, they were able to find out the countries which their classmates had uncovered. At this stage of the learning, students began to see the importance of meaningful shared learning. This sensation was expressed by P1 saying that "although this was an individual assignment, I felt it was some sort of group work as well because I needed to work and discuss with my friends for some understanding before I got on with the work. We categorized our findings according to working and living styles. These were what we found out together" (Appendix 18). Evidently, these were not mere discussion, but negotiation as well because students had to make common agreement to their shared observation. The evidence of the interaction could be seen with P10 remarking that "We discuss among ourselves based on the countries we explored to find the differences and similarity in the way people work and live. There were much talking in class". P10 noted that "We started to find interviews from countries that we didn't covered" (Appendix 27). The evidence of negotiation could also be reflected by P1 saying that "there is much information and we have to agree

and justify why we think our observation is real" (Appendix 18). The interaction led P10 to identify and negotiate the learning to be adopted.

Interestingly, P1 added that "There is no table to divide us. We need to talk to find out differences and similarities with the information I obtained based on our texting" (Appendix 18). This remark was of interest because the phase "No table to divide us" signified the realization of the need to collaboratively built up their knowledge base and to reify one's understanding of people's experiences. Observing the new paperless discussion process, P13 cited that "as we discussed, we looked at the massages on our phones" and that "was all we needed". P13 further emphasized that "all information was captured, stored and retrieved instantly" (Appendix 30). The students were able to discuss without any problem (P13). The sharing and transfer of information were surprisingly not that difficult because of mutual needs (P15). This approach of learning in and across real life contexts is now a key aspect of education at all levels in Finland. This approach has seen Finland elevated to the best education systems in the world, based on student learning outcomes (Bastos, 2017). This feature, combined with the many others discussed in this chapter can make a positive difference to design and effectiveness of learning experiences. This research thus added evidence to demonstrate how mobile devices could be an accelerator of this type of higher quality learning.

Through the shared regulation process, group members could develop their motivation together. When students engaged in the handling process of the information, internalization took place. Reflecting on her interaction, P1 moved on to evaluate the unstructured group data into categories (differences and similarities) that allowed effective sense making as mentioned earlier. This process ended with the gain

of wisdom by the individual not just enhancing one's 'own learning' but also 'working with people in and outside' of the classroom (P1, Appendix 30). P8 also remarked on the mutual sharing citing that "the mutual sharing of learning in class gave us the chance to talk to each other and we could select what we needed to complete the assignment".

Many of the students (7 students - P1, P4, P5, P6, P11, P15 and P21) became more alert and followed the interaction on the group Line for information. They monitored the progress of the group through their interactive activities posted on the Line apps and strategized to incorporate others' learning into their work in order to meet the requirement of the assignment. Socially share regulation of learning was witnessed in these cases. P1 indicated that by asking over the group Line had helped her to do and organize her work. "The interaction on our group Line" as mentioned by P1 had "allowed student like me to know who did what and who approached who for information" (Appendix 30). P4 and P21 added that "from the group Line, my friends posted some interesting interviews and I asked their permission to use the information"(Appendix 21 and Appendix 38). These reflections showed that the social form of regulation in learning were much more sophisticated than the other forms of regulation in that they required both individual and joint processes.

Undoubtedly, the mobile technology had provided a shared conversational learning space, which formed the social entity for not only the individual but group of learners. The group Line regulated learning consensually so that regulatory processes were co-constructed in reciprocal interaction. As such, students seemingly were more receptive as they were keen to ask questions on the communication apps. The group processing came with knowledge sharing and positive interdependency of each other

contribution. In such learning situation, where individual differences and strengths were accepted and put to use, they could serve as a resource for successful regulation processes within the group.

Obviously, mobile devices had helped students to process, organize, store, and recall the information they needed anytime and anywhere. Evidence of the innovative learning had extended beyond the classroom and curriculum. The impacts of SSRL were clearly voiced by P18 interpretation that “I don't think I have prepared a good report relating these experiences of Asean but with the help of my classmates and teacher, these interviews become richer”(Appendix 35). Expressing her contentment in learning, P10 also said that “after talking with others and among ourselves, I could see a ‘bigger picture' of people life” (Appendix 27). As for P21, her SSRL not only co-created new knowledge but also developed better reading skill. In her contentment, she said “if I have not read my friends’ work, I would not have understood what Baba and Nyonya meant” (Appendix 38). Significantly, these accounts highlighted the students’ satisfaction in their learning outcomes.

As put a crossed by P10, the texting and video calls on the mobiles were not that long but the interaction with friends and lecturer in class and on Line or WeChat were more intense “because now I need to put many ideas into the report” (Appendix 27). The interaction among themselves was therefore “useful because we started to notice who did what with who”. And with some of their friends posting their discussion on the group chat, it was a good ‘store’ of information to be used. In fact, the sharing according to P11 had allowed her to discover some other interesting interactions from their friends. With the knowing, P11 “sought help from classmates who had performed the same task with various participants” (Appendix 28). The

statements mentioned above had also supported the understanding that mobile devices enhanced learning by allowing students to gaining knowledge, improve learning skills and opportunity to experience. This in turns, enables students to work with multiple types of input from mobile devices such as identifying who to contact, comprehending what was uncovered and organizing and categorizing learning based on key concepts and comparisons. Last but not least, synthesizing information to create understanding and rationale behind the understanding.

Seemingly, students were also experiencing a variety of emotional and motivational challenges. Being task oriented and knowing the task requirement, students were able to see the lacking of their work as expressed by P12 that "as all my participants are from Singapore, my task is not fully completed" (Appendix 29). This sense of apprehension was also expressed by P13 that "I am aware that my two interviews were all from Myanmar and they could not give me an overall impression" (Appendix 30). To overcome this inadequacy, P4 felt relieved that she was able "to select work that I lacked and I think I have a say in that" (Appendix 21). It was possible because "the interaction on our group Line also allowed me to know who did what and who approached who for information" (P1, Appendix 18). The effectiveness of the interaction could be seen with the various remarks made by the students. While P9 commented that "I started to discuss with my group and talked about our project over weekends" (Appendix 26). P5 said that "I read the messages and what my friends discussed among themselves and with the instructor formally and informally" (Appendix 22). The learning impact as claimed by P1 was that "I am able to select what I want to make sure that I have a good combination of countries to give me the most impression" (Appendix 18). And the outcome was a result of "more interviews

and more views gathered. That is what I needed to complete the assignment" (P10, Appendix 27). As for P13, she approached her friend "for additional information". Consequently, it was according to P10 as being "teamwork and individual work all together" (Appendix 27) - a SSRL process that enabled the "combination of work that enhanced the quality of the report and our knowledge" cited P15 (Appendix 32).

Based on these feedback comments, it became clear that as students began to make plans to reach task goal, the regulation in learning intensified as they assumed greater learning responsibilities. This sense of responsibility was also mentioned by P6 claiming that "from this exercise, we take better responsibility of our work and we make better decision as to how we can improve our work" (Appendix 23). In other words, students identified learning gaps, made appropriate decisions, demonstrated ability to assimilate and organized knowledge to overcome shortfalls. This knowledge assimilation behavioral pattern accorded to the knowledge management perspective of taking new knowledge, incorporating and co-creating as one's own. A strong supporting evidence for this observation came from P13 as she related her learning experiences asserting that "we create the impression based on other's people sharing. So, the more we talked, texted and listened, the more we could understand why the differences and not just what were the differences" (Appendix 30).

A metaphorical sense of cooking was used by P13 shown in Figure 4.13 to further expressed her new knowledge co-creation experiences. She stated that "after talking with others and among ourselves, I could see a 'bigger picture' of people life. It is like cooking Tom Yum Soup. We add more ingredients and create a new recipe with what we have. The end product is a very 'aroy' homemade Tom Yum soup and how spicy the soup depended what people told us". The depth or 'spiciness' of the

learning as in the ‘dish’ came with the sharing and adding of information that was told by others (Appendix 30). And as cited by P18 “it is this sharing that has made the interviews outcome better”. This observation was in conjunction with the definition by Jennex (2005, p.53) that knowledge management was the process of selectively applying knowledge from previous experiences to current and future decision making activities with the explicit purpose of improving effectiveness in learning.

Figure 4.13: The metaphor of cooking the Tom Yum Soup

Source: Researcher’s own composition

4.3.11 Changing role of students

There was also an indication of the changing role of students in this ML context. Going through her learning experiences P9 concluded that “this assignment was actually very different from other group works. But this assignment, everyone took the role of the team leader. We must carry out the task by ourselves” (Appendix 26). This statement showed that the student was able to make comparison between ML and traditional learning methods. She had a different view on the concept of team and leadership in learning with each assuming a leading role in the SSRL process. The mobile technology-based learning was considered a new teaching method that students needed to be engaged and performed to learn. It was not a simple and easy task but an assignment that needed one to take personal responsibility to explore and co-create new knowledge. To undertake this role,

students needed to be “open-minded and try something new” as suggested by P5 (Appendix 22).

4.3.12 New learning attitude and responsibilities

Another notable change in the learning behavior was the cultivation of the civic responsibility students displayed on their ML tasks. A third of the students (7 students) specifically talked about this aspect. Students like P13 acknowledged that “This is not like the past. When we take people’s work seriously and respect their work by asking” (Appendix 30). The emphasis on the new learning behavior was influenced by changing attitude which was explained by P12 that “if we ask for permission, it is like you are asking them to be part of your work. It is not copying. It is like sharing because the other person knows and allows you to make use of the work done” (Appendix 31). Rationalizing the new attitude, P13 claimed that “the important thing I learned from doing this assignment was that if the task required you to share and learn, the pressure was less” (Appendix 30). Other than feeling the ease of learning, P21 also added to the reasoning asserting that “learning is more extensive when we share our knowledge. I think if you read other people’s work and carefully put all pieces together, you form a more completed ‘map of Asean life’” (Appendix 38). The social impact of the new learning attitude led to better learning outcomes as suggested by P21. This integrating of effort was also witnessed in the ML process of P12 when she mentioned that “when work are borrowed, I take time to read and arrange them” (Appendix 29). This statement denoted meaningful mCSCL contribution in knowledge sharing and the joint effort enriched the learning experiences.

Students like P4 and P6 observed that “from the group Line, my friends posted some interesting interviews and I asked their permission to use the information so as to “use their work to help me understand the context better” (P15). Reiterating on this matter, P11 said “I obtained the information from my friend …. using group line. I asked for her assistance and she agreed to share her learning with me” (Appendix 30). Students like P12 perceived the use of the group Line to ask for permission for assistance was “a good strategy”. She further explained her rational for the selection stating that “I selected 4 countries to analyze. Singapore, Cambodia, Philippines and Vietnam. I think it is good to have a developing country like Singapore, a fast developing country like Vietnam and Philippines and a slow developing country like Cambodia” (Appendix 29). Apparently, the selection of countries was important, reflecting deeper thought and the strategizing of the learning to incorporate others’ learning into her work to meet task requirements. The regulation of learning in a much complex learning process was thus witnessed in these cases.

4.3.13 Readiness to share knowledge

When sharing became mutual, students illustrated higher level of readiness to transfer information digitally as well (Rusly, Corner, and Sun, 2012). Students acknowledged the mutual benefits of the sharing. Enhancing relationships among classmates as indicated by P12 was an influencing factor of knowledge sharing. P12 stated that “personally, I would be happy to share my work because I know it would help my friends to understand more and at the same time, we become better classmates” (Appendix 29). The ability to select desired learning was another factor as revealed by P13 that “I think asking permission to use one work is

like group work except that you can select those work you want to add-in" (Appendix 30).

Reciprocal learning was witnessed with the P4 explanation that "When I have to ask for my friend to share their learning, I am prepared to share mine as well" (Appendix 21). The emphasis was therefore on collaboration rather than independent learning. Students worked together as peer partners. It was also clear that civil engagement among the classmates foster stronger relationships in this case. The sense of being in control of their learning process also reduced the pressure, increased enjoyment and satisfaction of the learning activities among the students as observed and from the students' feedback survey.

4.3.14 A distinctive case of change

An adverse impact of not been socially engaged was witnessed in the case of P16 (Appendix 33). This student made short and brief interviews with 3 individuals from Laos. She was the last student to submit the report in class and her work was unfortunately incomplete and below the standard when compared with students who were much more engaged and gained positive social learning experiences. There was no indication of her involvement or engagement in collaborative learning. She failed to demonstrate SSRL behavior. Not devoting time in peer learning, there was no sharing of information. Her inactive SRL behavior also had negative impacts on her learning performance. This case highlighted an imbalance regulatory of learning. Interestingly, in the following semester, under the same instructor in a course, there was striking change in learning behaviors of P16. The student became more comfortable in the ML classroom environment. The instructor called her name several times in class and she was eager to answer questions. She

interacted spontaneously and actively in class discussion and contributed to case discussion and analysis. She took initiative to search for information as well. This new learning behavior was absent during the previous semester. Noticing the change, the instructor told her of the observed changes, and the student smiled and said "I tried to be better and I think it is time to change". These was an apparent increase in her motivational level in terms of activeness in learning and regular attendance. She was determined to overcome previous developmental constraints that affected her learning. She informed the instructor that she had decided to focus more on her learning. She had also fine tuned her learning with mobiles. She was glad to receive the feedback and indicated her willingness to change to ensure better performance.

Another good learning case was that of P18. This student was taught by the same instructor in another course. He was rather weak in the English language and had difficulty in expressing well in English. To assist him, the instructor told him to write his feedback in Chinese. The interaction between the instructor and the student was carried out using Email. The feedback in the Chinese language was as follows:

> "我很高兴有这次的采访，让我认识到了以前从没了解过的生活和工作经验，让我对ASEAN的了解更加深入了，但是只是这个简单的访问并不能让我完全了解ASEAN，想要更多的了解这个组织，还需要进一步的研究.这是我的第一次采访其他人的经历，虽然不是做得很好，但是在老师和同学的帮助下，这个采访也变得很好了。很期待还能再有一次这样的采访任务."
>
> Thanks teacher☺
>
> The Learning is the reward

Together with the instructor, P18 translated the feedback. The Chinese-English translated version is as follows:

> "I am very happy with the outcome of these interviews. The interactions allow me to understand how people live and work in Asean countries. These

interviews let me understand the experiences that are not known to me. This makes me understand Asean better. However, these are simple and basic interactions. I need to do more research to give me in depth understanding. I don't think I have prepared a good report relating these experiences of Asean but with the help of my classmates and teacher, these interviews become richer with more insights. The sharing has make the interviews outcome better. I look forward for such interview-like learning task."

The feedback by P18 reflected the significant impact of effective mobile collaborative learning to overcome learning shortfalls of the student. The smiley emoji with the "Thanks teacher" signified learning satisfaction. Inevitably, the student felt motivated and engaged in the ML activity ending with the comment that "The Learning is the reward". It was his personal experience from the regulatory of learning (co-regulated and SSRL) that gave him the sense of reward (Appendix 35).

4.3.15 Creating networks of knowledge

It was also observed that solely dependent on one's social network was not sufficient to complete the learning task that sought diversity in experiences. P5 pointed out that "there are two other ways I learned outside my classroom learning time. My teacher arranged us to visit the Asean Cultural Center, …" and according to P6, "we visited the Asean Cultural center and we were able to get a list of contacts provided by the coordinator of the center". Related to the new source of contacts, P6 added that "Mr. A whom we met at the center, shared a list of his friends to us and I took this opportunity to work on my project" (Appendix 23). P6 felt assured that the recommended network could "make direct contact with the right person at the right place for the right purpose" (Appendix 23). Similarly, P10 also

mentioned that the given list of recommended people was from “my lecturer and the Asean Cultural Center guide”. This joint effort had witnessed the shifting from a community of learning to wider networks. The creation of a knowledge network via referencing was an important factor in the success of cross boundary learning.

4.3.16 Role of facilitator

Evidently, this ML task integrated the collaborative efforts of the learners, instructor and the learning partners. However, students were given the flexibility to navigate the needed knowledge and the role of the instructor was more of facilitating than instructional. As P1 described, “there isn’t much guideline as to who is right or wrong. We based on our understanding to create a list of what we thought could reflect people life and work experiences” (Appendix 18). Instructor was there “for suggesting and recommending the works of my friends” as mentioned by P21 to “complete the report”. In fact, the instructor role was more of a facilitator providing the support and motivation students needed. This had been observed by P4 saying that “my instructor provided the guidance as to how the report can be improved” (Appendix 21).

In other words, instructor not only provided the immediate feedback and assessment but also focused on personalized learning adjusting to the knowledge gained of the particular student and guiding them to the completion of her work. And as P13 explained that “my lecturer asked everyone to compare note to create some impressions from the people we have chatted” (Appendix 30). This statement indicated the instructor preference for social learning and understood the greater impact of social interaction to learning. P8 further noted that “when I gathered all the

information, I began to create my own impression of the Asean experiences which my lecturer would like us to learn" (Appendix 25).

4.3.17 Learning outcomes

With the completion of the assignment, there was a clear indication that majority of the students felt positive about their learning experiences. Similar positive feedback about the learning experiences and outcomes was received in other research where collaboration and socialization of learning was included as part of the learning design (Shelley, 2014). In his report, P3 summarized his reflection stating that "from this class project, my general impression of Asean based on these information have changed my earlier perception of Asean" (Appendix 20). There were many other noticeable remarks reflecting on how the students felt about the learning outcome. These remarks were as follow:

"This is a new knowledge for me." (P1)

"These were new learning." (P10)

"Have a bigger picture of Asean." (P10)

"Establish friendly relationship." (P11)

"Old mindsets are not the same." (P12)

" My interviewee helped me a lot about my grammar." (P12)

"They share their culture with me." (P13)

"I am confidence to talk to strangers in different countries." (P14)

"I also discovered some other interesting information." (P15)

"Try to get own answers to talk about it." (P17)

"I recorded their answers and I also wrote every part in my phone and I kept the data in my laptop as backup." (P20)

"I understood now." (P21)

"I am very happy had a conversation with them." (P21)

On the grading criteria, students like P6 hoped that "my instructor see my effort to create the work and more, enjoy the reading and understand that my work is reflective of the real world we live in" (Appendix 23). More importantly, P6 suggested that "it is not the grade that matters but being actively involved in every step of the task and making sure the work is meaningful drive me to improve and produce a good piece of shared work" that counted. Based on this reflection, it showed that students perceived that participation and active learning process were essential factors in assessing performance. The use of the phase "a good piece of shared work" signified the ownership of learning and denoted the acknowledgment of the joint learning effort of everyone involved. As for the word 'produce', it indicated that the work was student-generated and therefore individual student could take ownership of the learning.

In all, evidence based on the reflections of students showed that when students reflected on the teaching and learning processes, they strengthened their own capacity to learn. As reflection need metacognition skills, it highlights students' awareness of the learning and allow them to "close the gap" between what they know and what they need to learn. This was like what P15 had described "I started from just three interviews but with interaction and sharing, I managed to discover more than what I have expected" (Appendix 32).

4.4 Student survey questionnaire

With the completion of the second CAR, students were asked to fill a survey questionnaire of their satisfaction in terms of their learning materials, teaching

technique enjoyment in class and activities, the use of technology in learning, preferences on in-class and out-of-class learning, perspectives of using mobile in learning, role of instructor, interaction with classmates in class, perceived value in learning and suggestions for improvement. A total of 23 questions was asked. The survey questionnaire is presented in Appendix 39 with the survey outcomes table in Appendix 40. A diagrammatical result is presented in a radar chart as illustrated in Appendix 41. The questionnaire used a 5-Likert scale measurement with 1 as most disagreed with and 5 most agreed with. Most students responded favorably to the ML experiences. With a high score (5) in satisfaction in terms of learning materials available. Students also valued the interactive experiences with people online (4.7) and saw the usefulness of online and in-class communication among classmates (4.6 and 4.7 respectively). They found ML class as interesting and enjoyable (4.8 and 4.6 respectively) and were satisfied with the teaching methods (4.7). As for the use of technology in class, students welcomed the new tools (4.7) but for the use of mobiles in learning, students were more reserved (4.3). The slow response of the instructor (4.2) and problem contacting the instructor (3.9) might have dampened the preference of using mobile in learning.

4.5 Summary of the findings

The study provided an array of insights into the use mobile devices and learning experiences. There were many positive implications uncovered. Specifically, the observation from this research provided evidence to support the proposed research questions and directly addressed in concise form at the beginning of Chapter 5. Table 4.2 – Table 4.3 on the following pages present the summaries of the findings.

Table 4.2: Summary table of the 1st CAR findings

Findings of 1st CAR	
Critical elements	Findings (observed behaviors)
a) Conversational analysis	1. Regulatory learning behaviors of students in mCSCL activities did not conform to the existing model of SRL. The regulatory learning behaviors in mCSCL activities were unpredictable, spontaneous and instinctive in nature. It was non-linear as understood. 2. mCSCL activities could be initiated individually or as a group of individuals synchronically or asynchronically. 3. Flow of interactions across learning boundaries encouraged critical thinking Learners demonstrated higher SRL skill levels to reach task objectives. They were aware of individual and collective roles in learning.
b) Observation and reflection of facilitator	Self-regulated learning 1. Mobile was seen as an empowering tools to the regulatory of learning. Learner envisaged greater knowledge acquisition with increasing use of mobiles for learning. They felt enthusiastic and were encouraged. Even the quite students participated in the mCSCL activities. 2. The act of getting together signified higher SRL behaviors. Learners were optimistic in the boundary crossing ML approach. Active questioning signified high task awareness and meeting learning objectives in the mobile discussion. 3. Student engagement in mCSCL activities results led to progressive SRL in cross boundary learning which in turns facilitated co-create new knowledge. 4. Learners became more imaginative through their interaction with external learning partners. 5. The texting process was done on an individual level but learning (the flow of the interaction) was collaboratively and socially shared among all the participating members. 6. Learners were very excited to share their learning experiences. They were more confident with their student-generated content. 7. Their ML experiences enabled them to present without reading their note during presentation. They were more willing to step in to assist co-presenters and ready to provide additional explanation without hesitation.
	Co-regulated learning 1. The sense of knowing, the desire to share new knowledge, the eagerness to assist, support for team members and the relaxing mood in presentation were exhibited in learning activities. This sensation was unlike usual class presentation. The unity and confidence of the team surfaced sharply in the eyes of the viewers. Students during presentation readily supported co-presenters to enhance team performance. 2. There were mutual understanding that time was a constraint and expected responses might be delayed. 3. External learning partners could support metacognitive engagement and regulatory control of students. 4. Learners were able to organize the information and prepared the presentation with links provided by their learning partners. 5. Committed external learning partners could lead in the discussion with the posting of questions instead of only answering question asked. 6. The reflective questioning by the external learner partners could motivate learners to engage in critical thinking. 7. By way of questioning, the external other also displayed greater responsibility in the regulation of the learning, and allowing learners to focus more on the task enactment.

Continue Table 4.2: Summary table of the 1st CAR findings

Findings of 1st CAR	
Critical elements	Findings (observed behaviors)
	8. Subsequently, this supported the metacognitive engagement and regulatory control of the learners. Learners began to metacognitively monitor, evaluate, and regulate learning tasks and process the understanding. Hence, the collective monitoring and learning processes leveraged the metacognitive and motivational knowledge. This in turns, optimized learning. 9. There was a sense of ease towards co-sharing of learning
	Socially regulated learning 1. SSRL could be dominated by the co-regulated learning experience of the learners. SSRL might continue in sequential texting by the group of learners. Effective group online communication was a good indication of the collaboration and the socially-shared regulation of learning among learners and achieving learning objectives.

Source: Researcher's own composition

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Table 4.3: Summary of 2nd CAR findings

Findings of 2nd CAR	
a) Personal and Social Knowledge Gaps	1. Learners were aware that facts and figures could only help to reproduce and not construct new knowledge. 2. Memorization and recollection of information with no evidence of understanding could not bring about a change in learning behaviors. 3. Learners claimed that the possession of prior knowledge (based on personal knowledge and experiences) might allow them to share opinions on the subject matters. However, where information was limited and had real world relevance, construction of new knowledge was needed.
b) Receptive to mobile and social learning	1. There was clear indication that learners were open and positive towards social ML approaches. 2. Learners were able to differentiate between traditional and innovative learning approaches citing that ML tasks were unlike any of the other assignments. 3. Perceived as a new form of learning, there was much anticipation as learners believed that in authentic context, ML had positive effects on knowledge acquisition. 4. Learners felt that the integration of mobile technologies helped them to improve knowledge production and the interaction for information dissemination. 5. Learners felt that feedback was important. 6. The new mindsets comprised of both cognitive and emotional elements. 7. Learners indicated changing mindsets towards learning perceiving ML tasks as easy and 'Sannook'. The ease of communication and familiarity of texting enabled the change in attitude towards learning. 8. Emotionally, ML techniques was thought to be “pressure-free” that allowed deeper ‘understanding’. 9. It also fostered smooth learning experiences. 10. Learners felt that ML activities created greater sense of activeness in learning prompting them to engage in more complex search and discovery. 11. As the content of the learning deepen and became complex, learners started to think more and asked questions leading to greater cognitive processing of the information. 12. To access to new information, learning across community was viewed as necessary. Learners felt motivated to socialize through learning across community to gain access to new information and knowledge.
c) Cross boundary learning	1. The concept of cross boundary learning emerged as an important component in this study. 2. Learners envisaged ML with the expansion of learning boundary that was no longer confined to the classroom space. 3. The ability to remove the physical space restriction was significant to learning as it signified learning beyond curriculum. 4. Learners considered cross boundary learning as a good way to learn incorporating interaction to improve understanding. 5. Learners embraced the technology and were unafraid to proceed with the interactive tasks. 6. Learning partners were viewed as ‘friends’ and learners felt confident to communicate. 7. Learners agreed that technology made learning productive. 8. They were enthusiastic about online interaction and saw the advantage of networking for learning purposes.

Source: Researcher’s own composition

Table 4.3 Summary of 2nd CAR findings (Cross boundary learning)

Findings of 2nd CAR	
Identification in cross-boundary mechanism	1. Learners acknowledged that identifying the right person to assist in knowledge sharing was challenging. 2. This exploration task required careful decision making. 3. The process signaled higher student engagement and active learning. 4. Standard setting reflexes high self-efficacy of learners in planning the learning 5. The process was taken seriously by learners as they advent the task. 6. To overcome the concern on the dissemination of knowledge from external sources, learners deemed trust as the critical in developing good social relationships.
Co-ordination in cross-boundary mechanism	1. It advanced as learners and their external learning partners identified effective ways to enable better co-operation. 2. Learners through active texting were able to "ask more questions" and could receive information that were not available in class. 3. However, learners also realized that the willingness of the external learning partners was crucial to their learning. 4. In an effort to encourage interaction, learners created friendly atmosphere conducive to learning. This self-regulated behavior would lead to internalization whereby the learners applied the new information and knowledge gained to the learning tasks. 5. Co-operation between the two parties became more mutual with the out-of-school boundary-partners eventually taking a greater role in the collaboration efforts.
Reflection in cross-boundary mechanism	1. Learners were convinced that the engaged conversation promoted active learning as they began to "think a lot more". 2. Ability of the learners to listen carefully also enhanced metacognitive skills to absorb and analyze information for deeper understanding. 3. Learners felt that they were able to develop new perspectives from the interactions. 4. Learners would go through the learning process of experiencing, reflecting, conceptualizing, and acting to create new experiences. 5. As learners refined or develop new perspectives, they showed better ability to comprehend different elements in society towards a more coherent understanding of people and society. 6. These discourses supported deeper learning. 7. Community of learners acting as mutual peer coached to exchange and reflected on their everyday situation for learning purposes.
Transformation in cross-boundary mechanism	1. Interaction gave new understanding enabling students to envisage diversity in learning. 2. They were able to comprehend the innovative learning methods to explore, understand and construct new knowledge with new dimensions. 3. The higher capacity to construct new knowledge was enabled by the use of the internet among the learners. 4. Transformation not only enabled the establishment of new perspectives but allowed learners to assess the learning. 5. The cognitive ability to assess learning was crucial in the understanding of the self-regulatory behaviors in learning. 6. Motivated learners would take extra progressive steps to gain more information to facilitate the co-creation of new knowledge and to meet learning objectives.

Source: Researcher's own composition

Continue Table 4.3 Summary of 2nd CAR findings (Cross boundary learning)

Findings of 2nd CAR	
d) Self-regulated learning	1. Learners acknowledged that knowledge and SRL skills were the precursors to ML. 2. Learning performance were closely linked to learners active involvement towards the task. 3. Learners were aware that SRL and the support of external learning partners would help them to integrate information from different sources to create student-generated contents. 4. They also understood that effective SRL would help them to foster trusting partnership leading to the construction of new knowledge. 5. Learners played significant role in choosing the type and amount of information they needed. They proactively selected, organized, and created advantageous learning environments. 6. Learners became alert to factors hindering the tasks. They practiced better time management to have greater control in learning. 7. Learners were inquisitive to search further into the topics of interest. 8. They worked independently and were ready and willing to prepare, execute, and complete the learning tasks. 9. Learners set their performance goals. 10. Co-regulation in learning created a new learning culture. The social impacts of the collaboration were distinctively. Learners articulated with each other enhanced the knowledge sharing process thereby transforming the classroom into a 'noisy' learning space where the new interactive learning culture emerged. 11. The degree of activeness signified the important understanding of how, what, when and why to use the communication tools in the knowledge management processes. 12. Learners worked collaboratively to solve possible task problems. The opportunity to interaction between peers created a Zone of Proximal Development (ZPD). 13. The co-regulated learning generated positive effects on SRL. Learners became adaptive in the learning process. 14. SRL not only reinforced engagement but motivated learners to get into actions for greater learning experiences within the social and cross-boundary context. 15. Learners were able to see the importance and meaningfulness of socially shared learning. 16. In the SSRL process, learners involved in negotiation and made common agreement to their shared observations. They were able to collaboratively built up their knowledge base and reified one's understanding. 17. The sharing and transfer of information were difficult because of mutual needs for the learning. 18. Learners felt motivated as a group. When engaged in the handling process of the information and internalization took place. 19. The group Line regulated learning consensually so that regulatory processes were co-constructed in reciprocal interactions. 20. SSRL not only co-created new knowledge but also developed better reading skills among learners. 21. In SSRL, learners synthesized the information to create understanding and the rationale behind the understanding. They were also able to "combine work to enhance the quality of the report".

Source: Researcher's own composition

Continue Table 4.3 Summary of 2nd CAR findings (Cross boundary learning)

Findings of 2nd CAR	
e) Changing role of students	1. Learners felt that learning with mobiles was not a simple and easy task but an assignment that needed one to take personal responsibility to explore and co-create new knowledge. 2. To undertake this role, learners had to be open-minded and willing to try something new.
f) New learning attitude and responsibilities	1. There was the cultivation of the civic responsibility among learners. 2. Learners showed greater respect for each others' work and sought permission to use the student-generated work. It was considered shared and not copied work. 3. The new learning attitude led to better learning outcomes.
g) Readiness to share knowledge	1. Learners' contribution in knowledge sharing and the joint effort enriched the learning experiences. The mutual benefits of the sharing accelerated the readiness to transfer information digitally. 2. The sense of being in control of the learning process reduced the pressure, increased enjoyment and satisfaction of the learning activities.
h) Creating networks of knowledge	1. It was also observed that solely dependent on one's social network was not sufficient to complete the learning task that sought diversity in experiences. 2. This joint effort had witnessed the shifting from a community of learning to wider networks. 3. Learners reckoned that the creation of a knowledge network via referencing was an important factor in the success of cross boundary learning.
i) Role of facilitator	1. Although ML integrated the collaborative efforts of learners, instructor and learning partners, learners were given the flexibility to navigate the needed knowledge and the role of the instructor was more of facilitating than instructional. 2. Instructor not only could provide the immediate feedback and assessment but also focused on personalized learning adjusting to the knowledge gained of the particular student and guiding them to the completion of the work.
j) Learning outcomes	1. There was clear indication that the majority of the students felt positive about their learning experiences. 2. Learners were less grade concerned but sought for new criteria to assess their performances. There were suggestions to focus on the understanding of the work generated, the degree of creativity, engagement and the enjoyment in reading the generated materials to assess performance.

Source: Researcher's own composition

CHAPTER 5

ANALYSIS AND DISCUSSION OF THE RESULTS

5. Introduction

In Chapter 5, the findings from the 13 months CAR is discussed, providing the support and explanation to the understanding of the learning and knowledge construction process in the social ML context. Based on observation and extensive review of the reflective insights of students' ML experiences, the researcher looks at the cues from the empirical evidences gathered to answer the research questions on:

- Students' perception of mobile learning
- Usage of mobiles in the learning processes
- Factors influencing mobile learning
- Regulatory learning and the co-creation of new knowledge

This research provides useful insights to answer the originally proposed research questions listed below. This chapter specifically answers each of these questions using evidences from this research study and connects these evidences with other supporting observations from the researcher and other publications.

The short answer to each of the research questions are:

1. How do students perceive mobile learning?
    a. In a very positive light once they understand the purpose and approach of including mobiles in the learning design.
2. How do learners use mobiles to facilitate learning processes?
    a. Learners engage in socialization of concepts to build and share new knowledge and co-create new insights about the topics being discussed. This happens both in classroom situations and beyond,

which extends the learning process into real life contexts and enriches the learning experiences.

3. What factors influence mobile learning?
    a. There is a significant number of complex factors that influence how mobiles are used and how effective these are in learning. Many of these are discussed in the section following in this chapter, in light of the evidence from this research.
4. How does regulated learning with mobiles facilitate co-creation of new knowledge?
    a. In an environment designed to stimulate socialization of learning activities through mobile devices, the learners find ways to self-regulate their learning activities. Once they are aware of the importance of sharing and seeking new insights in learning quality (rather than just transfer of existing content), they become adept at co-creating new knowledge and understand how this can be applied to change future possibilities.

Longer answers for each of the four questions are provided in the sections below. For brevity and flow for the reader, and to enhance the flow of the argument not all the specific evidence for each of these summary comments are included here. However, wherever possible actual statements by the learners are inserted into the dialogue to support the statements being made (as was done in Chapter 4) and these are displayed as “quotes”. The connections between the specific evidence and these points are included in the detailed discussion in Chapter 4 and also in more details in the transcripts and other supporting data in the appendices.

5.1 Students' perception of mobile learning (ML)

From the focus group discussion, students highlighted several emerging perspectives on ML which were beyond the technology and functionality of mobiles as a learning tool. These perceptions are presented in Figure 5.1. It is important to acknowledge the following aspects mentioned by the students:

a. Social interaction is essential in ML activities. Informal interaction allows greater flow of thoughts and sharing in social experiences.

b. Students envision wider learning boundaries with access to advance communication technologies. The sense of isolation as in an "island" or classroom is no longer a barrier with ML. Empowered with the mobile tools, students are much more confidence to explore new and authentic ways to amplify their learning.

c. Learning becomes interactive and enjoyable. Students feel that they are connected with the content in a more meaningful way and having the choice to choose as to how they can apply their learning.

d. Students envisage a greater role of the instructor as facilitator in the new learning process. Prompt feedback by the instructor enhances meaningful learning.

e. Students regulate their learning collaboratively to leverage their learning performances.

f. Students see the value in the co-creating of new knowledge via social ML.

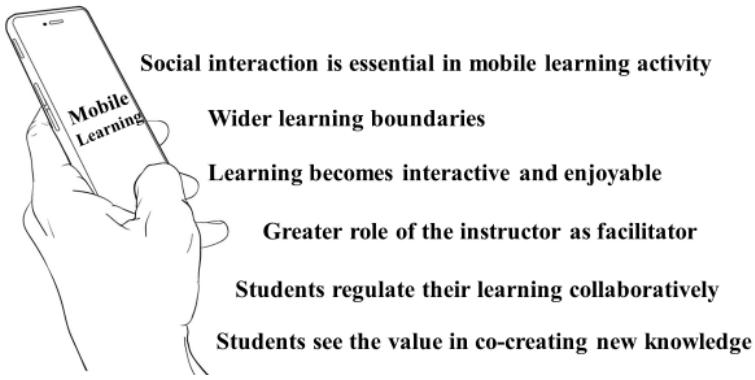

Figure 5.1: Students' perspectives of mobile learning

Source: Researcher's own composition

These six perspectives identified based on the research findings help to answer the first research question on how students perceive ML. With the refined perspectives, there is the need to rethink about the ML process. It is apparent that students, who are the users of the technology, see the impact beyond the technical aspects of the learning. With a deeper understanding to the impacts of socialization in learning and a more complex and authentic outlook to this learning approach, the next important question to ask is: "How learners can use mobiles to facilitate the learning process?" To answer this question, the discussion focuses on identifying what attributes contribute to the current ML process and how these impact the process.

5.2 Re-conceptualizing mobile learning process

Once learners understand the impacts socializing around the concepts being discussed, they then can understand how learning can be enhanced with mobile devices. This research indicates interesting relationships between self-regulation of learning, collaborative learning, and the construction or co-creation of new knowledge

in the ML process. The interdependency of the learning elements as depicted in Figure 5.2, gives rise to new learning behaviors and learning patterns in the ML context. Detailed discussion of the evidence supporting these statements are in section 4.3.8 to 4.3.12.

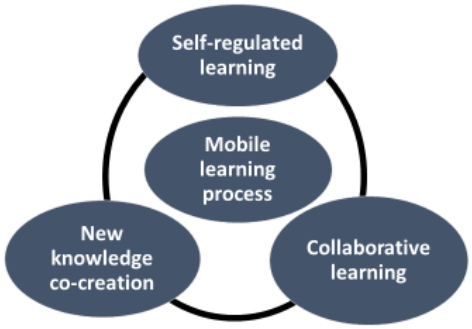

Figure 5.2: Three components influencing the knowledge construction in ML process

Source: Researcher's own composition

5.3 Changing regulatory learning behaviors

The self-regulatory or intra-personal regulation (Grau and Whitebread, 2012) in learning is the accepted behavior of a student regulating their own learning without the intention to influence other students. It is often understood that when students work in pairs or groups, they must move into the co-regulation or inter-personal concept of regulation and socially shared regulation with "multiple others regulating their collective activity" (Hadwin & Oshige, 2011, p. 254). If this is so, the regulatory process as seen in Figure 5.3 is rather linear as suggested by existing models of regulation in learning.

Figure 5.3: Flow of regulatory learning behaviors in a classroom ML activity

Source: Researcher's own composition

However, from the case studies in the first CAR, it is clear that in an interactive cross-boundary ML context, the regulatory of learning for individuals is not linear and sequential as suggested by Järvelä and Hadwin (2013). The research findings supports a SRL model that is multi-dimensional and complex. In fact, based on the flow of interaction and regulatory learning behavioral patterns, the regulation of learning is non-linear and non-directional. This highlights why the traditional teaching models are limiting in the modern learning environment (Dovey & Fisher, 2014; Snehi, 2011). Now that mobiles are available, it makes sense to leverage these to stimulate learning and co-creation of new insights rather than remaking in one-way transfer of existing knowledge. The analysis of the regulatory learning behaviors of the learners in ML adds to our understanding of how students learn with mobiles. Although it is an individual process but it is not individualistic and closely linked to learning context as this research has indicated. This is an important detection from the SRL perspective as it provides the support for the theorization of ML process. This comprehension helps us to have a better insight to answer to the second research question of how learners use mobiles to facilitate learning processes. Detailed discussion of the evidences supporting these statements are in section 4.3.8.

5.4 Influencing factors in mCSCL

There are many factors that influence ML, especially in tertiary education where collaborative and communicative discourse are necessary for pursuing knowledge. The findings from the second CAR identifies interesting factors that reflect the experiences of the students base on their mCSCL activities. Detailed discussion of the evidence supporting these statements are in section 4.3.

5.4.1 Accountability in collaborative task

In their research examining the conceptual and theoretical connections between ML and SRL, Sha, Looi, Chen, and Zhang (2012) argue that in ML, learners need to assume the responsibility of their own learning, more so than in other types of learning, due to ubiquity afforded by mobile technologies. The research findings reinforce this linkage with supporting evidences. From the active interactions that emerge between students and instructor and among students, an important component that surface is the show of accountability of the students in ensuring that they complete their own share of the work while assisting others to complete theirs. This sense of responsibility is strengthened with the perceived connectedness via their mobile applications. Students demonstrate greater mutual engagement in their willingness and readiness to share and transfer knowledge and information when they are being approached with requests being made on their mobiles. Detailed discussion of the evidence supporting these statements are in section 4.3.12.

Worth mentioning is that students in these ML activities are more expressive in terms of asking for help and showing appreciation when they received the needed support. The reciprocal acknowledgement of the sharing and acquisition of knowledge enhance the quality and outcome of the learning. Interestingly, students suggested that

performance in learning should embed the active interaction that prevailed with the use of technologies. The request for sharing indirectly indicates that these learning materials are student-generated. The greater the collaboration and sharing with acknowledgement, the higher the sense of ownership to the content. As one student said, the sharing brought pride and showed the importance of one's work. The impact of the instilled ownership to the learning means that content is no longer a "copy and paste" work but a learning that requires one to put "effort into reading" and to be adapted into "a good piece of shared work". Detailed discussion of the evidence supporting these statements are in section 4.3.17.

5.4.2 Students' commitment, integration and motivation in ML

Consistent with the study by Shih, Chu, Hwang, and Kinshuk (2011) in a context-aware ubiquitous learning activity, significantly positive changes in attitudes by the students have been observed. Shih et al. (2011) observation that students are more focused on the learning content presented on the mobile devices supports the research findings that focus on the cognitive efforts to read and interpret each other's work, reflect higher level of commitment and motivation in the ML activities. The process of reading is a crucial phase in turning "information into knowledge". Figure 5.4 illustrates students in reading mode during a ML session in the 2nd CAR. When this occurs, student "understood the content and received better understanding". Because technology enabled students to engage in social interaction with significant others in cross boundaries contexts, students regard such practical experiences as "consolidating their effort to the building up of knowledge". Hence, the learning they are exposed to is no longer perceived as "a

piece of information" but knowledge which they can present confidently to others and "without reading the note" while presenting. Therefore, this new knowledge acquired is based on the sharing of learning experiences. The evidences mentioned in support to these statements are found in the two CARs especially in case 1 of the first CAR (section 4.2.1) whereby students confidentially delivered their co-created content in their presentation. In the second CAR (section 4.3.9), student (P19) determined to enhance her learning to a higher level, retrieved an article relating to new information she gained from her conversation and came up with a summary of the article to affirm her learning (see Appendix 38 and section 4.3.9).

Figure 5.4: Students engaging in active reading during ML task in the 2nd CAR

Source: Researcher's own composition

5.4.3 Learning designs encompassing teachers, peers and community relationships

From a pedagogy point of view, the reinvention of learning activities depend on transforming pedagogy and redesigning learning tasks. In many universities in Thailand and elsewhere, the lecture model still prevails as the dominant instructional approach and there has been minimal use of ML approaches. A concern indicated by Stanton and Ophoff (2013) in their study on method for ML design traditional user experience knowledge was inadequate as "speaking and thinking

inside many barriers" with the focus "to get grade". This sentiment is voiced when students in the study expressed frustration through the metaphor of "tons of questions" but hesitant "to ask all those questions at the same time in the class". On the other hand, with ML, students are more receptive to the new learning method and engage in a range of questioning to each other and the facilitator. They felt no need to "pile up questions" and were "less hesitated" to ask "anytime and anywhere".

For this learning to have impact, "communication is a must" and that "changing the way things are done inside and outside the class" is needed as well. Hence, students are seeking change in the teaching and learning designs with ML. There are many ML designs as depicted in Figure 5.5. ML strategy is an important factor attributing to effective learning and performance. Learning with technology allows students to engage in authentic real-world learning and this is considered a powerful learning strategy. Especially from the social impacts of ML, it develops learning relationships with teachers and partners in the community and working collaboratively with peers to enhance productive learning experiences among the students. This understanding of the ML process was highlighted by one of the students that the instructor did not want the class to "not just read through the books". Instead, "she wants us to experience by our own self". This means mobilizing students to learn from the "outside world" and it is "more fun to have this kind of class that let us to experience". The need to promote learners' autonomy and creativity in learning activities are thus essential to create a better path towards a more realistic approach to ML. Supporting evidences and discussion on the impacts of social learning are presented in section 4.3.2.

Figure 5.5: Creative ML designs for innovative and more engaging learning

Source: Researcher's own composition

5.4.4 The boundary mechanism and impacts of cross-boundary learning

Central to ML designs and strategies, is that mobiles serving as boundary crossing tools allow students to breakthrough the "walls" enclosing the classroom into the third space. The Third Space is a term coined by Kearney, Schuck, & Burden (2010) to signify the crossing of learning boundaries. Despite several recent research publications by Wen Shen, et al (2017) and Alsaadat (2017) in examining the boundary mechanism in ML, the immense capacity of mobile networking technologies to enable learning beyond closed digital spaces is still limited. Specifically, the cross boundary mechanisms of identification, coordination, reflection and transformation received very little analytical attention. This CAR research narrows the knowledge gap with empirical evidences base on the cross boundary ML task. Figure 5.6 depicts the cross boundary ML activity in progress and

leveraging a variety of mobile devices for different purposes at once in different settings.

Figure 5.6: Students and instructor engaged in cross-boundary learning in 2nd CAR

Source: Researcher's own composition

5.4.4.1 Students' perspective of the boundary mechanism: Identification process

Although students have their own social network and contacts, it may not be diverse or complex enough to support cross boundary connection for specific learning. That is why students realize that it is a challenging task to connect to individuals who possess the desired information needed for effective experience sharing. From the students' perspective, the identification process as depicted in Figure 5.7 is a robust active learning process comprising of 3 main processes namely, *reaching out to, interacting with* and *connecting* to the experiences of the right people. The supporting evidence are discussed in section 4.3.4.

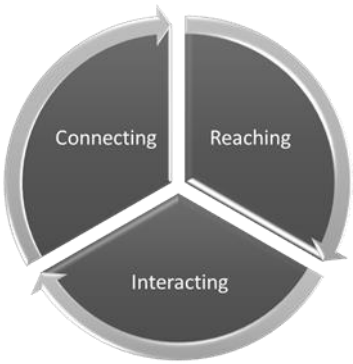

Figure 5.7: The identification process in cross boundary learning
Source: Researcher's own composition

Prior to this identification process, students expressed apprehension due to the fear that they might not locate the appropriate individuals. Furthermore, if they did, would they be granted the opportunity for the sharing remains a question. As such, students tend to be more careful in this initial stage making cautious decisions as to whom they should approach to assist them to make good connections for their task. Locating better sources increases the chance of meeting the task objective and helping them "to score well" (Appendix 28). This flow of thoughts is significant in our understanding of the ML process in cross boundary context. Students' high level of engagement is significantly linked to their desire to perform well. Crafting an optimal way to attain the right experiences is seen as a pre-determining factor to effective ML. Perceived as exploratory task, students also see the identification process as a 'Who and How approach' to find the significant others for a safe and stimulating engagement. Therefore, the prior process to identification includes careful decision making, setting the selection criteria and making efforts in the internal and external network sourcing for the desired significant others.

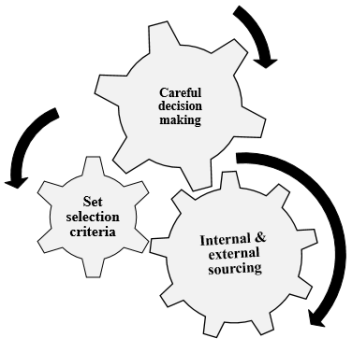

Figure 5.8: Prior to the identification process

Source: Researcher's own composition

The instructor has an important role in facilitating the sourcing in the identification process as highlighted by the students. Facilitators from the university or external institutions can assist students. As seen in this case and illustrated in Figure 5.9, many of the students obtained a list of connections from the personnel of a visited institution (for example librarians, other teachers etc.). This joint effort is significant as it enables the widening and diversity of the learning experiences which characterized cross-boundary learning. Therefore, it is observed that the creation of knowledge networks via cross-referencing is crucial for the successful boundary crossing learning.

Figure 5.9:Supports from an external learning institution in cross-boundary learning

Source: Researcher's own composition

5.4.4.2 Students' perspective of the boundary mechanism: co-ordination process

In the co-ordination stage, the self-regulatory behaviors of the students intensify as they start to focus on outcomes of their interactions. To ensure effective collaboration, establishing an appropriate ambiance is an initial step which the learners make effort to develop and a question and answer session follows. Significantly, students are aware that the degree and extent of the learning depend on how motivated the external learning partners see the interaction. That was why, about a third (7) of the students mentioned it was important that a good introduction to the task purpose as the starting point of the interaction. With the understanding that the information provided is "not available in text or from classroom learning materials", students realize the value of the sharing and transfer of knowledge from their learning partners. As such, students engage in active interaction which generates new content and this is part of the new knowledge creation process. Students also begin to reflect on the interactions that have taken place leading to the internalization of the learning. This insightful understanding allows them to apply the new information and knowledge gained in the learning task.

Developing relationships emerge as a common theme among the responses of participants. The evidences from the second CAR supports the fact that active sharing in cross-boundary learning motivate the two learning partners to develop reciprocal relationship. The discussion of the evidences supporting these statements are in section 4.3.13. The findings show that raising level of active engagement through questioning, discussing and reflecting on the content also helps students to

increase their level of learning as well as understanding of people's experiences. The supporting evidences are mentioned in section 4.2.3.

When external learning partners (ELP) become motivated, they are more willing to provide other assistance as a sign of support to the learning and the learners. This was seen when the interviewee offered to help the student to improve her English language when they engaged in the conversation. Figure 5.10 illustrates the process in which students encounter in the co-ordination process in cross boundary learning using mobiles as learning devices.

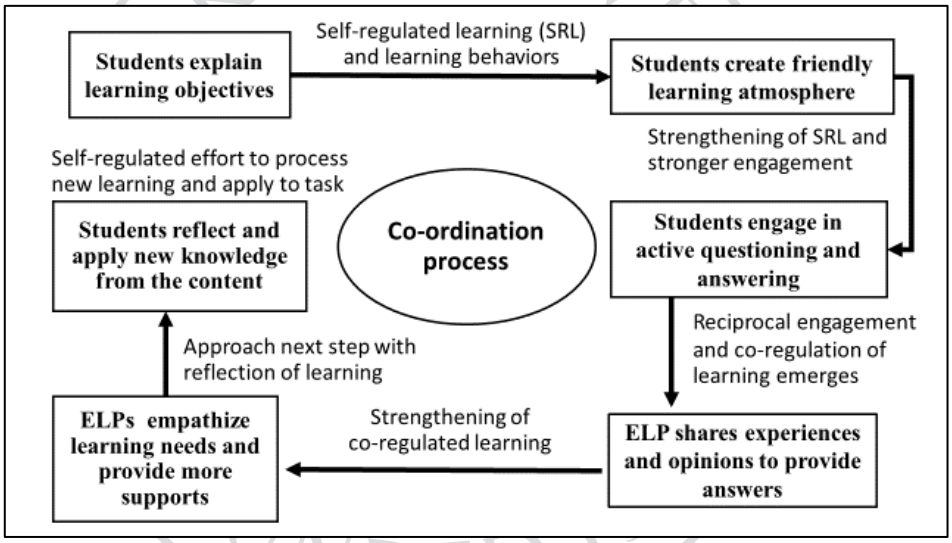

Figure 5.10: Co-ordination process in the cross boundary machanism

Source: Researcher's own composition

5.4.4.3 Students' perspective of the boundary mechanism: Reflection process

The reflective process is the next important step towards the construction of new knowledge. With the new understanding based on the importance of interaction, students are more receptive to diverse perspectives and

social experiences. The text messages are read with care for details which they may find useful and meaningful for reporting and also with greater awareness of multiple ways these messages may be perceived (in addition to their own interpretation). Paying attention to reading is a sign of student continuous effort and engagement in the learning process. Students generally perceived the interaction that have taken placed in a positive manner. With the recorded text information, students are able to read and re-digest the information through reflective thinking. In fact, the takeaways are more than expected in many cases as they can go back over what are said in this format, which is not possible with unrecorded conversations or lectures.

It is observed that students realize that conversations make them "think a lot more". This added benefit is vital, in that the reflection on learning stimulates the metacognitive skills of the students to better prepare them, especially for the analyses and co-creation of new knowledge to apply and integrate into the learning task. As put forth by P17 that there were too many facts to be remembered but the easiest way was to talk and listen directly from others. She admitted that she had the wrong information about the capital of Myanmar and rectified her own misunderstanding. This case is presented in Appendix 36 and discussed in section 4.3.10. This is just one of the many new learning students acquired with their social interaction and how their reflection on the learning increased their understanding. Another good case discussed in section 4.3.7 was the reflection of the student (P20) on the quality of bus services and the rationalization process she had undergone to comprehend what she had learning. P20 case is different from other cases because her reactions and actions from her learning are good support to the transformational phase in the boundary mechanism.

The impact of the interaction is also significant as the learning partners are able to indicate specific information relating to the topics of discussion. The keywords provide new directions for students to further explore the concepts and discover an even greater sphere of learning which if not "chatted" will remain unknown or of little interest. This "dive-in" or directed learning behavior of SRL is strongly demonstrated in many of the reports submitted by the students. As one of the students had mentioned "just through books and network are not enough to really understand". Thus, direct interaction or social learning allows them to "learn a lot of things" and forms friendships and community for learning.

The interaction not only influence students in terms of perspective taking, it also helps them to form new perspectives as reflected in the case of P20. Student displays good metacognitive skills in asking and making comparison on how it will be like living in a new country as a local and or foreigner. The supporting evidence is found in Appendix 39. Students become more critical in their thinking and look beyond what is expected in the learning task. Apparently, they take a more neutral stand in the way they see problems and identify solutions based on rational thinking. This observation is clearly reflected in P12 remarks on how the different economic status quo of each nations affects development and influence the mindsets of the people towards living and working. Ability of the students to categorize countries based on economic growth and integrating their new learning to form an impression is worth mentioning because the interactions have enabled the visualization of the learning. The diversity of the interaction generates strong impressions and subsequently helps students to develop deeper learning leading to the construction of new knowledge in a collaborative sense. Therefore, in this reflection stage, students

can interact by voice or text or even video call for the cross-boundary learning. The transcripts show they go through the learning processes of experiencing, reflecting, conceptualizing, and acting to create new experiences. The transcripts also show many examples of mutual support and willingness of sharing by the learning community contribute to the effectiveness of co-regulated learning.

Mutual understanding can be reached with greater effort from SRL after or during the exchanges and reflection generates new perspective taking and co-create new knowledge when applies to task. The active engagement will enhance the interpersonal relationship as well. Figure 5.11, presents the flow of activities during the reflective process in the boundary mechanism in ML.

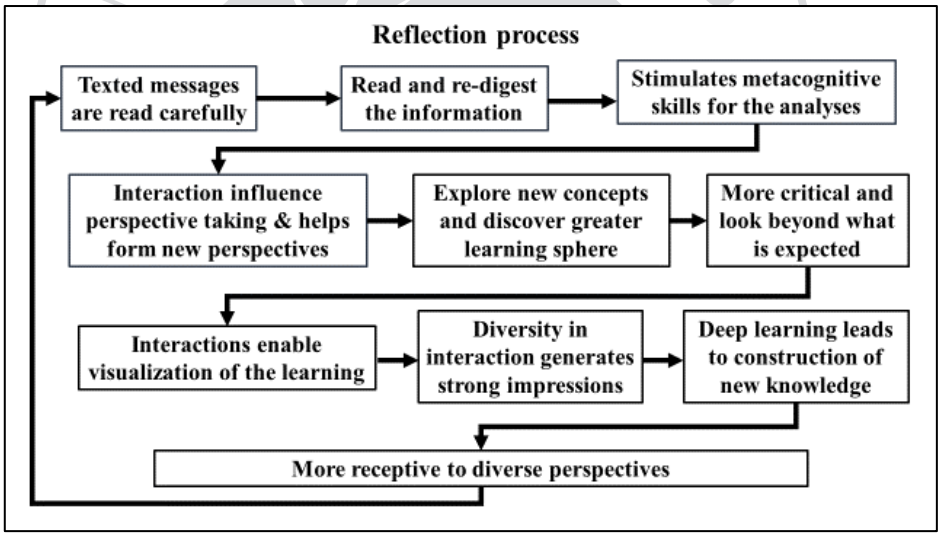

Figure 5.11: Figure 5.12: Reflection process in the boundary mechanism

Source: Researcher's own composition

5.4.4.3 Students' perspective of the boundary mechanism: Transformation process

The transformation process is not easily explained as seen by the use of metaphors by the students to describe their

experiences. The metaphor of a well-lighted house and the bouquet of flowers relate to the removal of physical barriers where the bulk of knowledge housed and the diversity in the selection of social experiences respectively. The transformation process can be witnessed based on the depth of the self-reflection and assessment of the learning by the students. The ability of the students to make assessment of the new understanding and to generate better explanation signify the consolidation of the new knowledge acquired is visible as a repeating pattern in several of the transcripts.

As explained in the findings, to understand the preferences of the people, students conducted more research into area of interest online. Reading articles on specific issues allow students to refine their reasoning skills as in the case of assessing why people prefer traveling on public transport in one country as compared to another. As such, the knowledge shared and transferred from the collaborative ML, motivate students to effectively and timely enhance the new knowledge co-creation process and subsequently, the quality of learning.

When students are able to connect themselves to the new learning, two interesting observations are made. In the second CAR, a student decided to make a visit the home country of the learning partner to witness the kind of lifestyle that she had been introduced to. Similarly, a group of four students decided to make a trip to the country which they have learned and to further their real-life exploration. These two instances may reflect an emerging trend in learning. Students nowadays have greater opportunity to authentic learning and either individual or in group make effort to explore into not just the space but physical boundaries that are better known to them via cross-boundary learning.

Adding on to the transformation stage, students may explore out of the comfort "mobile" zone for experiential learning as in the case of one of the student. The interaction includes a wide range of new findings for this particular student. There is discussion about wages and comparison are made and how people can survive on these wage rates. The issue of health insurance is also mentioned. In her report, P20 tried to organize her information that meet the requirement of the learning tasks. But she decided to explore further as discussed in section 4.3.8. These new knowledge are made known to the student if not for her continuous SRL behavior and efforts. The understanding and reflection based on student learning experiences and behaviors have allowed the researcher to develop a transformation process that students are likely to go through. Figure 5.12 depicts the transformation process in a cyclical flow based on students' experiences.

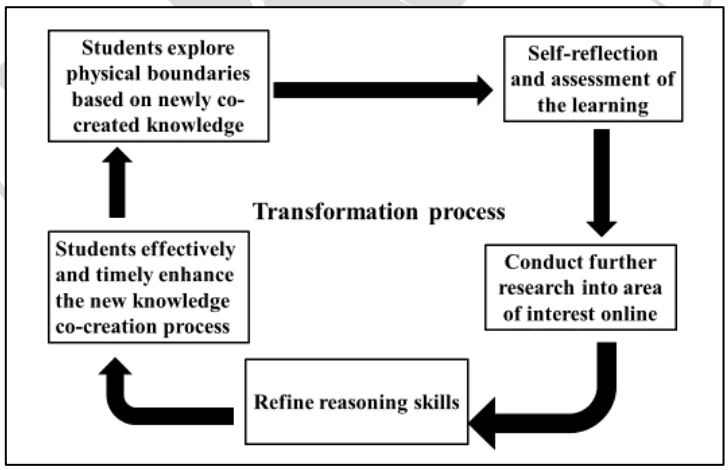

Figure 5.12: The transformational process in boundary crossing mechanism.

Source: Researcher's own composition

5.4.5 Role of the learning facilitator

Interestingly, students envisaged a changing role of instructor which deviated from its traditional knowledge transfer "teaching" role to one that was multidirectional facilitation. This role however does not equate with lesser responsibility. Instead, it involves greater accountability in terms of providing feedback, connecting and bridging knowledge gaps, motivating students to pursue learning challenges and communicating for learning purposes. In addition, the closer bonding with the students implies the opportunity for more personalized learning with mobile interaction with the facilitator. This new role has significant impact, as it is seen as adding greater value in the collaborative learning process. This change in role has been mentioned in the recent study by Schenke, van Driel, Geijsel, and Volman (2017) highlighting that narrowing the research and practice gap involves on how cross-professional collaboration is shaped. Good linkage between researchers and practitioners is needed to develop sound understanding. Supporting evidence in the changing role is discussed in section 3.16. A sound supporting evidence of students recognizing the altered role is based on P6 reflection that the frequently feedbacks from the instructor is productive and that he sees himself "making changes and approaching my classmates for good input to the report". This indicates greater collaborations between teacher and students. As such, communicating with the facilitator is essential in the learning process. The open communication channel has allowed students to interact with the instructor more frequently and easily either individually or in group. This effectively extends the hours of availability of the instructor and may not be the preference of all teaching staff, especially traditionalists. This findings also affirms Schenke et al., (2017) view that teachers in boundary

crossing activities learn to approach their teaching with a more inquiry-based attitude. They are able to incorporated new concepts in teaching and adopts methodological techniques for evaluation.

Although there is a perceived decrease in teacher-regulation, students are given greater autonomy in the ML process. Interestingly, students' suggestions on how they should be assessed signified the significant impact of the teacher facilitating role to the positive influence on the ML process and learning outcomes. Detailed discussion of the evidence supporting these statements are in section 4.3.16 and 4.3.17.

5.5 New knowledge co-creation in regulated learning

From the important shift in the role of the instructor to become a facilitator, this discussion looks into the new knowledge co-creation in regulated collaborative learning environment. In view of the findings and observations from the 2 CARs, in-depth interviews, and the learners' feedback reports, the researcher sees the need to rethink the ways we conceptualize the process of new knowledge construction in a regulated ML environment. Undoubtedly, learning with technology has altered our learning processes and the way we construct knowledge and co-create new knowledge. The complexity, flexibility and extent of the learning sphere impact the evolution in ML. There is a blurry line between formal and informal learning as indicated by the students when ML is concerned. In fact, students see the value in the co-creation of new knowledge which indicates the learning trend towards greater authenticity in learning. The influencing factors of new knowledge co-creation put forth by the researcher are as follow:

a) The design of the in and out of classroom learning activity

b) Degree of mutual engagement in cross-boundary learning

c) Willingness of the learning partners

d) Involvement of the learners

e) Degree of directed learning

f) Sharing and transfer of knowledge using mobiles

g) Role of facilitator in ML activities

h) Values learners associated with ML

Importantly, as experienced by a class of students in the “Help Nepal 2015” case as shown in Figure 5.12, students need to share and assess with peers their learning through well-designed collaborative learning tasks that enable them to adapt the learning to new contexts such as the cross-boundary context. SRL behaviors and context are closely intertwined (Berkhout, Teunissen, Helmich, van Exel, van der Vleuten, & Jaarsma, 2017). Without opportunities to interact or practice, the integration and application of the new knowledge will be difficult to accomplished. Hence, to improve ML, the learning environment needs to ensure that it provides greater opportunities to communicate new knowledge and solve complex problems through collaboration. Learning facilities in such environment will need to adjust how they interact and the times that they do this.

The 2015 Help Nepal case

Source: Researcher's own composition

Figure 5.13**:** Applied learning in cross-boundary context (2015 Help Nepal)

5.6 Limitations

This study is limited by being a small number of students in a few classroom situations and in a limited range of cultures and topics. Whilst there is no doubt mobiles makes a difference to the learning experiences of these learners, more research in other situations, cultures and topics should add further credibility to the models and ideas raised in this research. In addition, subjective observations of people engaging with each other in social contexts are often criticized by quantitative researchers. However, this uncontrolled, unpredictable situational subjective interaction is the way we learn to deal with the unpredictability of human ecosystems. There is no way to reliably reproduce complex social ecosystems, but this does not

mean we cannot learn for them. More studies in such subjective environments will assist us to understand more about how to bring some complex approaches into what we do as learning facilitators to enable better learning. This is especially important as instructors are often challenged to make discussions in the complex and rapidly-changing world. Last but not least, it is acknowledged that social media networks can be a challenge to vulnerable students and this needs to be considered in the design of learning interventions. When mobile devices are being built into the learning experience design, it is critical to ensure that engagements are safe and supportive of the desired learning outcomes. Appropriate monitoring needs to be implemented to ensure inappropriate practices are prevented or quickly acted upon to generate the optimal environment for safe learning.

5.7 Recommendations

The researcher hopes that this research will inspire other learning facilitators and instructors to examine further in terms of ML approaches. There is opportunity to continue this research into other levels of learning and design learning activities to extend the incorporation of greater interactive collaboration with more learning communities to increase the dynamic creative social ML applications that engage students towards new knowledge co-creation. In particular, this research can be done in other cultures and at secondary or postgraduate tertiary levels and with different age groups to see understand how they might interact better through mobiles. The in-context lifestyle learning approaches being undertaken by the Finnish Government have elevated their education system to become the best in the world over recent years (Bastos, 2017). Perhaps these too can be further increased by

introducing mobiles to stimulate more socialization around this real-world concept-based education.

With the new understanding of knowledge construction in the social ML processes, there are three important questions instructors need to consider. The first question pinpoints to the emerging elements crucial in ML that instructors should now be aware of. The second question examines how these factors influence learning and the design of learning activities. The third question directs instructors towards the optimization of regulatory learning behaviors to improve the design of learning activities for students. The three questions and recommended answers are presented in Table 5.1.

Instructors embracing ML need to take into consideration the emotional and social implications of the learning that shape the content itself when assessing the outcomes. The criteria for assessment of content should be extended to incorporate the boundary mechanism. Appropriate application of mobile based social learning can offer ample opportunities. Instructors need to explore into creative and innovative learning designs to optimize the knowledge co-creation effort of stakeholders. The sustainability of ML can then be led to improved teaching and elevate quality of learning as proposed by the researcher.

As the findings demonstrates the critical influence of SRL behaviors, instructors need to refocus on learning designs that optimize the regulatory learning behaviors of students. When the communicative learning tools enable the engagement of a wider audience in the learning process, perspective taking and making become context sensitive and this means instructors ought to be receptive to new learning outcomes. Learning activities should stimulate and sustain the proactive learning

behaviors and gear towards effective transformational learning to generate new knowledge. The co-creation of new knowledge is value-added to the ML process. This is crucial as it motivates students to engage in deep learning as indicated in the research findings.

This research in many ways has re-conceptualized the ML processes from the students' perspective. The next logical research area should focus on the assessment of activities. This is a major concern of the students as it is a benchmarking measurement of the learning performance. ML inevitability will become the mainstream learning strategy. The researcher foresees that research into new evaluation criteria is required. This classroom action research encompasses rich research data that reflects the perspective and interest that enable future research to conduct a quantitative research to increase the generalization of the findings. For further research, more studies in social learning is still needed emphasizing on the human interaction across different learning boundaries. The sense of emotion, identity and value generated increase the sense of ownership to the learning and content generated. This in terms ensures more sustainable outcomes that have enduring effects on students' work and community.

Table 5.1: Key questions and recommendation for instructors

Key findings	**Key questions for instructors**	**Recommendations for instructors**
Emerging perspectives of ML Social interaction is essential in ML activities Wider learning boundaries with access to advance communication technologies Learning becomes interactive & enjoyable A greater role of the instructor as facilitator in the new learning process Students regulate their learning collaboratively to leverage their learning performances Students see value in the co-creating of new knowledge via social ML. Regulation of learning is non-linear & non-directional	1. What are the important factors that need to be considered with these new ML perspectives?	With the emphasis on interaction, instructors can design learning designs that encompass the knowledge from teachers, peers and community. Instructors need to take into consideration the emotional and social implications of the learning that shape the content itself when assessing the outcomes. Importantly, instructors ought to be receptive to new learning outcomes.
	2. How can the new perspectives influence learning activities?	Learning activities should be designed to stimulate and sustain the proactive learning behaviors of students and particularly gear towards effective transformational learning to generate and co-create new knowledge. The criteria for assessment of content should be extended to incorporate the boundary mechanism.
	3. How can instructors design learning that optimize the regulatory learning behaviors of students?	Instructors should stimulate learning and encourage students to co-create new insights rather than remaking in one-way transfer of existing knowledge. To do so, instructors can mobilize learning by allowing students to share and transfer knowledge via interaction and messaging. This in terms increases mutual engagement and enhance effectiveness of socially regulated learning to a greater impact on individual students. When social learning is embraced, it also help to develops new learning culture of asking and helping. Instructors are therefore highly recommended to cultivate new learning culture through proactive interaction to optimize the regulatory learning behaviors of their students.

Source: Researcher's own composition

5.8 Key Contributions to the body of knowledge from this research

The key contributions of this research to the body of knowledge in ML are:

1. A strong body of evidence from series of Classroom Action Research interventions that demonstrate student openness towards using mobiles to stimulate better quality learning outcomes.
2. The Strategic Co-creation of New Knowledge in mCSCL Model created during this research (Figure 1.6) provides a new way to approach ML, to generate optimal learning outcomes and extend the learning beyond the classroom - encouraging learners to collaborate, socialize and co-create new knowledge and enable crossing of space and time boundaries.
3. Evidence for, and understanding of how, mobile interactions can stimulate new knowledge co-creation, thereby shifting learning from the bottom of Bloom's Hierarchy of remembering existing knowledge to the top co-creating new insights. This shift elevates the learning activities to where the optimal value is generated in terms of applied capability for learners. A new more comprehensive definition of ML that highlights how the technology can enhance the social learning process:

   Mobile learning is a mobile supported socially regulated collaborative learning process whereby learners with their personal communication tools engage in interaction with and beyond one's boundary to share and co-create new knowledge.

4. Mobiles can have positive impacts on learning outcomes when students' interactions are appropriately designed to leverage them. Some possible approaches for implementing these ML interventions, and the aspects that influence their success are detailed.
5. Evidence that learners are already adopting mobile devices in their learning and this highlights the education and learning industry will benefit from being proactive in their development and adoption of these opportunities.
6. Insights into how the practice of content based 'teaching' is shifting to one of co-creation based "learning facilitation". This has impact for the role of education institutions will be and how they achieve success. Simply putting content into mobile systems is insufficient for optimal learning, we need to create the environment where the learners socialise the ideas to generate new insights and applications. This has strong implication for the role of teachers in future (if not already so).
7. Just as significant, this research has 'refined' the learning process and giving in-depth description of the cross boundary learning processes using mobiles and these process can be easily associated by the students. This is critical because existing models are general theoretical and the lacks practical linkage. In fact, the existing models have been conceptualized and created based on the description provided in the literature reviews. The comparison of the existing concept and the new descriptive models highlight the distinctive differences and usefulness of the findings for the further development of a Mobile Learning

theory. The sharp comparison of existing and new processes in cross-boundary learning are shown on the following pages in Figure 5.14 – 5.17.

In the identification process as presented in Figure 5.14, the new model embeds prior steps before the start of the Identification process which have not been mentioned in any existing models.

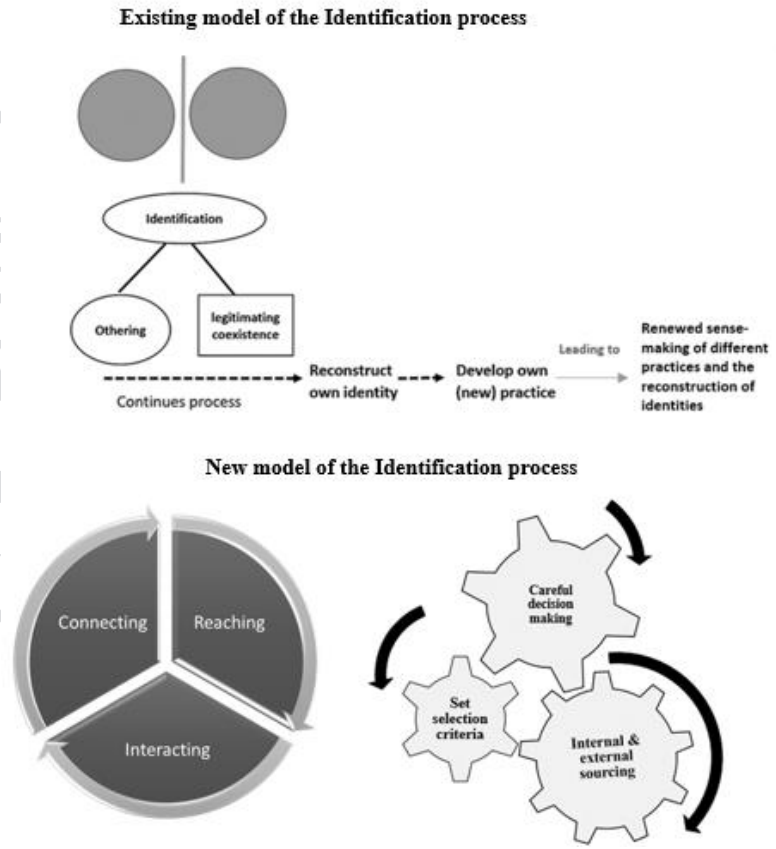

Figure 514: Existing (Figure 2.6) and new model (Figure 5.7) of the Identification process (Figure 5.7) including the prior process of Identification (Figure 5.8) in cross boundary ML

Source: Researcher's own composition

Unlike the existing model, the new co-ordination process as presented in Figure 5.15, has included the sequential steps students may take during the co-ordination phase. Another important component of the new co-ordination phase is the recognition of the regulatory of learning. The flow of regulated learning behaviors clearly demonstrated the inadequacy of the existing model. This research has provided new lights into the theory of Self-regulation in learning.

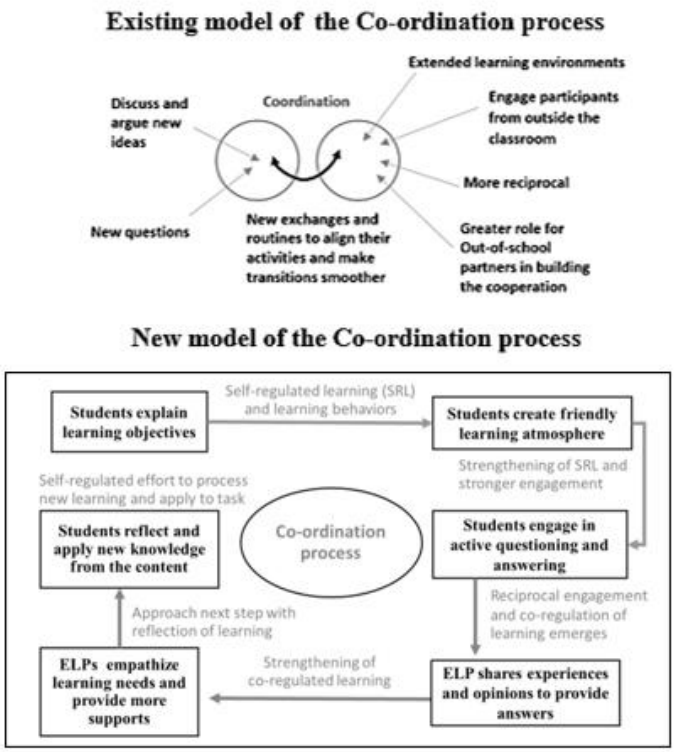

Figure 5.15: Existing (Figure 2.7) and new model (Figure 5.10) of the Co-ordination process in cross boundary ML

Source: Researcher's own composition

As for the reflection process, the research takes a further step in describing the possible metacognitive involvement and development in the reflective process of students. It also signifies changes in learning behaviors as well as important impacts of social learning.

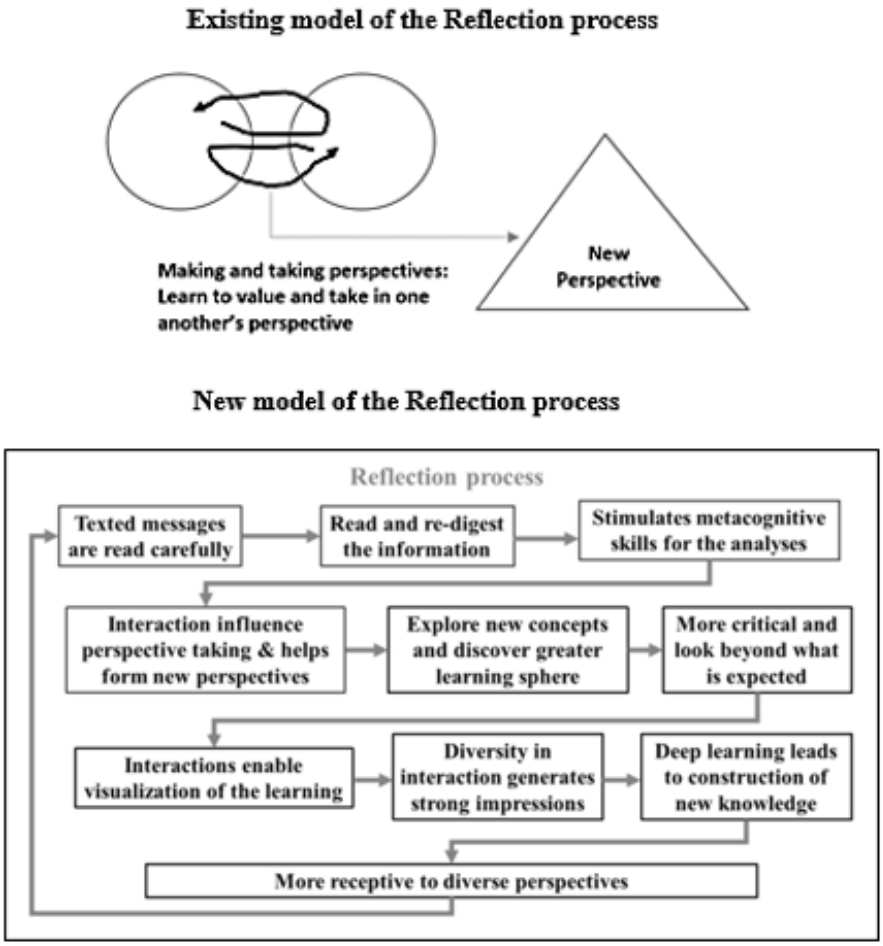

Figure 5.16: Existing (Figure 2.8) and new model (Figure 5.11) of the Reflection process in cross boundary ML

Source: Researcher's own composition

The Transformation process in this research projects a futuristic outlook or prediction into the possible new and experiential ML behaviors of students in the near future.

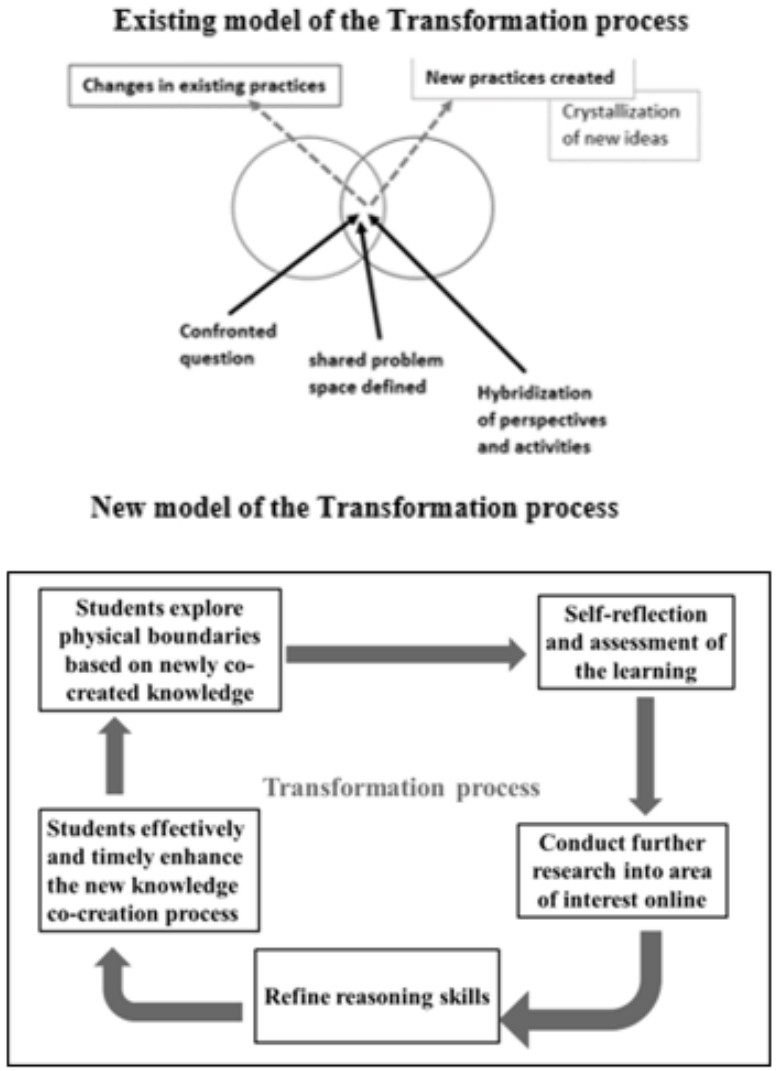

Figure 5.17: Existing (Figure 2.9) and new model (Figure 5.11) of the transformation process in cross boundary ML

Source: Researcher's own composition

5.9 Conclusions

This research demonstrates that mobile devices are an excellent way to stimulate the social co-creation of new knowledge. The use of mobiles can extend the learning beyond the immediate content of the defined curriculum, and surpass physical constraints of the classroom. Well designed mobile interactions, that are aligned with the desired learning outcomes engages the participants in learning how to learn. Such social experiences prepares them to be more productive career in our unpredictable and rapidly changing world. There is usually some initial discomfort in this learning approach, because it is different and unfamiliar for the participants. However, when the learning facilitator highlights the reasons for the unfamiliar approach, the learners soon become comfortable and excited about this approach and the discomfort soon disappears. In sum, the implementation of the three recommendations above will enable learning facilitators achieve enhanced learning outcomes, engage learners better and improve their learning experience.

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APPENDIX

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Appendix 1: Key papers on the research on self-regulation learning

Key papers on the research on self-regulation learning		
1	Boekaerts, Pintrich, & Zeidner (2005)	Handbook of self-regulation
2	Hadwin (2013)	Response to Vassallo's claims from a historically situated view of self-regulated learning as adaptation in the face of challenge.
3	Pintrich, P. R. (2000)	The role of goal orientation in self-regulated learning
4	Jarvela & Hadwin (2013)	New frontiers: regulating learning in CSCL
5	Schunk& Zimmerman (2008)	Motivation and self-regulated learning: theory, research, and applications
6	Winne, Hadwin, & Perry (2012)	Metacognition and computer-supported collaborative learning
7	Kitsantas (2013)	Fostering college students' self-regulated learning with learning with learning technologies
8	Dettori & Persico (2011)	Fostering Self-Regulated Learning through ICT

Appendix 2: Key papers on the research on co-regulation learning

Key papers on the research on co-regulation learning		
1	Järvelä, Näykki, Laru and Luokkanen (2007)	Structuring and Regulating Collaborative Learning in Higher Education with Wireless Networks and Mobile Tools
2	Allal (2011)	Pedagogy, didactics and the co-regulation of learning: a perspective from the French-language world of educational research
3	Chan (2012)	Co-regulation of learning in computer-supported collaborative learning environments: A discussion
4	Jarvela and Hadwin (2013)	New Frontiers: Regulating Learning in CSCL
5	Malmberg (2014)	Tracing the process of self-regulated learning-students' strategic activity in g/n study learning environment
6	Ja¨rvela¨, Kirschner, Panadero, Malmberg, Phielix, Jaspers, Koivuniemi and Ja¨rvenoja (2015)	Enhancing socially shared regulation in working group using a CSCL regulation tools
7	Hayes, Smith and Shea (2015)	Expanding Learning Presence to Account for the Direction of Regulative Intent: Self-, Co- and Shared Regulation in Online Learning
8	Zheng and Yu (2016)	Exploring the behavioral patterns of Co-regulation in mobile computer-supported collaborative learning
9	Jarvela, Malmberg, and Koivuniemi (2016)	Recognizing socially shared regulation by using the temporal sequences of online chat and logs in CSCL

Appendix 3: Key papers on the research on socially shared regulation of learning

Key papers on the research on socially shared regulation of learning		
1	Panadero and Järvelä (2015)	Socially Shared Regulation of Learning: A Review
2	Malmberg, Järvelä, Järvenoja, and Panadero (2015)	Promoting socially shared regulation of learning in CSCL: Progress of socially shared regulation among high- and low-performing groups
3	Jarvel, Malmberg, and Koivuniemi (2016)	Recognizing socially shared regulation by using the temporal sequences of online chat and logs in CSCL
4	Rogat and Linnenbrink-Garcia (2011)	Socially Shared Regulation in Collaborative Groups: An Analysis of the Interplay Between Quality of Social Regulation and Group Processes

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Appendix 4: In-depth focus group interviews via MIM for the pilot study

Questions posted to students in the in-depth focus group interviews via MIM for the pilot study are as follow:

1. How do you perceive ML?
2. What it is like using MIM in learning?
3. How do you see the interaction with teachers in and/ or out-of-class with ML?
4. What are the differences between formal and informal interaction in your opinion and how?
5. How does ML help you to share and create knowledge?
6. How do you regulate your learning using mobiles?
7. How do you co-create new knowledge with your mobiles?
8. What are the values you think you gain from using mobiles in learning?

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Appendix 5: Questions asked in preparation for report writing in 2nd CAR

Questions asked in preparation for the report writing in the 2nd CAR

(A) Before the interaction

1. What is your first impression of the task to use MIM to talk and share experiences with others in an Asian country?
2. Do you know what the task requires you and your friends to do?
3. What is the objective of the task assigned to do?
4. What do you do for preparation before the interaction?
5. How do you identify the person whom you need to speak to?
6. How well do you think you have prepared to interact with your interviewee?

(B) During the interaction

1. How effective was the conversation? Did you manage to gather info needed?
2. Besides the prepared questions, have you managed to ask new questions?
3. How do you coordinate the learning activity in your group members?
4. Have your conversation meet the objective of the task?
5. Have you face any problem during the discussion?

(C) After the interaction

1. Who have you interviewed? What is the general impression you have obtained from your interaction?
2. How do you evaluate your work?
3. Have you gather sufficient information to proceed to the next stage of your project?
4. How do you set the standard to your quality of your groups and among the groups?

Appendix 5 (continue):

5. What do your team do after you have acquired the data on the MIM Apps? How does the MIM apps helps you to continue your work?
6. Reflecting on what you have learned, do you think you have formed a new perspective to the topic of discussion?

Do you find boundary crossing learning interesting? If yes, why is it interesting?

7. How do you evaluate the information you have gathered?
8. Do you think your prior knowledge of the topic is helpful in the creation of your new knowledge?

(D) <u>New knowledge co-creation</u>

1. How does the cross-boundary communication transform the way you learn?
2. How do you share your group learning?
3. How do you communicate with the other group members in your class to integrate the work that you have done?
4. How much of cognition is involved in this cross-boundary learning experience?
5. Do you see yourself co-creating new ideas with your friends in this project?
6. What is your overall impression to the new knowledge co-creation experience using MIM and learning activity?
7. How would you assess your own performance, group performance and overall class performance in this learning activities?

Appendix 6: A summary of Guba's four criteria for trustworthiness

A summary of Guba's four Criteria for Trustworthiness

Quality criterion	Possible provision made by researcher
Credibility	Adoption of appropriate, well recognized research methods Development of early familiarity with culture of participating organizations Triangulation via use of different methods, different types of informants and different sites Tactics to help ensure honesty in informants Iterative questioning in data collection dialogues Negative case analysis Debriefing sessions between researcher and superiors Peer scrutiny of project Use of "reflective commentary" Description of background, qualifications and experience of the researcher Member checks of data collected and interpretations/theories formed Thick description of phenomenon under scrutiny Examination of previous research to frame findings
Transferability	Provision of background data to establish context of study and detailed description of phenomenon in question to allow comparisons to be made
Dependability	Employment of "overlapping methods" In-depth methodological description to allow study to be repeated
Confirmability	Triangulation to reduce effect of investigator bias Admission of researcher's beliefs and assumptions Recognition of shortcomings in study's methods and their potential effects In-depth methodological description to allow integrity of research results to be scrutinized Use of diagrams to demonstrate "audit trail"

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Appendix 7: Transcript of Group 1 in the pilot study

Transcript of the texting in the group Line for the pilot study (Group 1)

Conversation started on Sunday, April 17, 2016 (1.19 p.m.)

Aj: Do you use smartphone in your learning process? How frequent?

Ra: Yes, smartphone makes us very easy to share knowledge even if we are far away from each other…… it is a kind of socializing in modern way with different kinds of people.

N: Yes, Most (90%) of my learning is from online sources since they are easily accessible.

G: Yes, it is very essential part in my learning process as there is so much more information and knowledge out there than only in the books. I use smartphone for learning process everyday.

Ra: Almost every time (emoticon sunglass with a smile)

Aj.: What do you think about ML? What is ML to you?

Ra: For me, it is kind of socializing in a modern way with different people.

G: ML has both pros and cons for me. For instance, sometimes in the name of using ML, I get distracted which leads me to use other social medias.55555.

G: On the pros side of course ML is very interactive, breaches the gap between teachers and the students, doesn't limit the course in the class only.

Aj: How do you source information using smartphone?

G: For me ML is like learning everywhere at any time.

Ra: ML is almost everything, different society, different people and different perception.

Appendix 7 (continue):

N: ML is an effective tool which makes learning quite accessible with its easy availability, convenience and desire informational materials.

G: For me information sourcing via smartphone comes very handy. I source for business vocabularies, online essays and reports, news, trend, etc.

Ra ML is enjoyable, its kind of sharing information.

Aj: How do you transform information into knowledge that help you in your learning? An e.g. of how K is transferred &acquired for good use.

N: Aside from the sources provided by the teachers online, I mainly like to source additional information to boost my understanding on a particular topic & also keep myself updated with the current situations worldwide, browsers such as Google, Safari & Facebook come in handy as well.

Ra: I prefer explaining my information through example. For e.g.: if u ask people to drive carefully they may not take u seriously, but when u tell them an example how the careless people have accident and also the consequences after the accident, they will get alert for sure whenever they drive.

G: "I would like to give a recent example of my experience with Aj. GENE. I was in a brainstorming session at the office and as soon as I got an idea, the first thing that pop in my head is to confirm whether the information that I had could reflect my knowledge.

G: The process of constant questioning to my professor via mobile has been so helpful as I can get answers to many of my curiosity outside class at any time.

Appendix 7 (continue):

N: Through ML, I actually put an effort into reading the content or the information. This actually helps me turn information into knowledge as through the process of reading, I understand the content & received better understanding. Getting further practical experience actually consolidate my building up of knowledge as well.

G: As of now, most of the professors use email as the main source of contact outside the class. The bad thing about this is I need to wait for the professor to answer for a day or sometimes for weeks.

G: I guess the professors are trying to keep things professional.

Aj: So, what do you think of interaction with your teachers? In and out-of-class?

Ra: In ML you get to know the answer and question that arise in other people mind also. I believe sharing the question that arise in different people mind also help u learn a lot. It would be better if I ask the question and he teacher gives an answer to everyone not only me help the whole class.

G: It depends on the professors. Sometimes some of the professors seem very welcoming. If that's the case I don't have any problem starting a conversation with the teacher. But, if the teacher is firm, I don't feel comfortable approaching the teacher just for a simple talk as well.

Ra: I think becoz if u interact outside the class also u get to know a lot about their situation and thinking they go through outside the class.

Aj: Is that collaborative learning to u?

G: For me teachers engaging in social medias seem to be more welcoming.

Appendix 7 (continue):

Aj: Do you think there is a difference between formal and informal interaction?

N: Yes, if they can be available via social media it would be better.

G: Clearly, there is a vast difference between formal and informal interaction. I learn better with informal interaction with class that the subject is more of practices and concepts. Similarly, if the classes are related to mathematics, then, I don't mind formal classes.

Ra: Yes of course. I think in formal interaction u speak and think inside many barriers but in informal interaction u can talk about any thing just a random traffic on a highway.

Aj: Do u think there is a gap between the 2 forms of interaction & learning?

N: Yes, I believe formal interaction is quite constrained as it is based on learning that focuses on courses to get grade while informal interaction focuses more on personal learning.

Aj: Informal and formal learning

Ra: Yes there is a very thin gap that is easy to cross and also cannot see. Or depends on the people, how they interact.

Aj: What do u mean depend on how they interact? Please tell me more.

G: There is a definite gap between formal & informal learning. The main gap for me would be hesitation. I say this bec' there is so much more I want to learn as a student but there is constrained by formal learning. This way, by the next class I would have tons of Qns but I would feel hesitated to ask all those Qns at the same time in class. But if I had ML (eg. informal learning) than I can ask

Appendix 7 (continue):

Qns to the professors at anytime & at anywhere. This way I don't have to pile up Qns & less hesitant.

N: I guess the main gap is the availability of the time of the teachers. Most people like to keep their professional & private life separate so they allocate separate time for these 2 things and don't let them combine. At one point its understandable, but considering ML this aspect proves to be major hindrance.

Ra: I think the formal interaction is the first phase and informal interaction is second phase. If u interact more and more, u can go through to informal passing by formal. But some people don't love to open up and listen so they end up in formal interaction.

Aj: To bridge formal and informal learning, what do u think is needed?

N: Time flexibility on the side of the teachers, the student pro-activeness too

Ra: I think the more u interact the more u close the gap between informal and formal interaction. The communication is the must.

Aj: Beside interaction, what else?

G: To bridge the gap between formal and informal learning, the first thing that should be done would be related to change management. This includes changes in the way things are done inside and outside the class. Of course, teachers need to set a different mindset regarding the importance of both formal and informal learning.

Aj: Do u think you can effectively share knowledge through informal and formal learning?

Appendix 7 (continue):

Ra: Besides interaction I would try to put my words in every conservation. And share with more people. And also try implement in my daily interaction.

Aj: Are u more willing to share knowledge formally or informally? Why

Ra: I prefer to share knowledge informally because I believe that it make me and the second person to share our knowledge very comfortably and not think much about what they will think if I speak something wrong.

N: Yes, informal knowledge should be given more recognition as it actually contributes to more knowledge towards the students as it reflects the student pro-activeness and initiative to learn.

G: I feel more obligated to use formal way of sharing than informal.

Ra: I prefer to go with informal way. It gives me the way to think outside my comfort zone without any prohibition.

Aj: Do you feel that you are more engaged in your learning using a mobile?

N: I would prefer informal way for sharing my knowledge however there are not much platforms that can help me share this knowledge as such informal learning tends to be individualistic.

G: In terms of engagement, of course use of mobile is more interactive.

N: Yes, ML is more interactive.

Aj: By mean of more engage, I am referring to your ability to create idea knowledge not just remembering what you learn.

Ra: No, not much. Becoz we discuss our group work and share our content through mobile. But learning, I don’t think so.

Appendix 7 (continue):

Ra: But I would love to engage in learning using mobile becoz we can engage from our own place and think in our own n space.

N: For higher learning, I believe informal method through face-to-face interaction is much more effective in creating new ideas rather than virtual ML.

G: One bad part about ML would be those group of people who lack behind. I mean, if there are people in the chat who talk a lot, have a lot of creative ideas, they suppress the not so talkative ones. This may discourage some of the people not to engage in the conversation.

Ra: If u use ML, u feel free to speak becoz u r in your own space. But in offline u think about a lot of things that even don't happen and don't feel to speak out.

N: Through physical informal setting, we can actually encourage one another to participate and also can contribute to their learning process. However, through virtual, it solely depends upon the student initiative. If student does not feel like contributing and also others cannot encourage them to do so.

Aj: Overall, do you think ML will increase your learning engagement and academic performance?

Ra: Yes, it would contribute to my learning as it provides me with an opportunity to receive answer to my queries with ease and also share my knowledge.

G: For me, definitely ML would be a great way to engage & learn outside the class. Also, as evidenced by my academic performance in both IMC (Integrated Marketing Communications) & IBM (International Business Management) class with Aj. Gene, it is wise to say that ML has a positive

Appendix 7 (continue):

academic result. With this being said, we need to consider that particular group of student who lay low & don't talk at all.

G: G (FLOATING MARKET, coffee shop Prapadeang 1:30-2:30

N: N (Location: coffee shop at Prapadeang / Occupation: student in utcc ic/ Time: 1:30 – 2:20)

Ra: I am Ra. I am from Nepal. I am Bachelor 3rd year in UTCC. Now I am in floating market, coffee shop in Prapadeang. It took me 1:20 to 2:20.

Aj: G can you please state the year and program you are in. N too please. Do you allow me to use what you have printed for academic research purposes? Thank you for your time and involvement in this study by Ms. Genevieve Lim.

Re: Year 3, IBM, BBA. Both G and N.

Conversation ended on Sunday, April 17, 2016 (2.24 p.m.) Friday, April 29, 2016 (11.26 a.m.)

Aj: Hi girls thank you very much for all insights to your learning experience. I have compiled all your saying into 4 booklets. Deeply appreciate for all your contribution. Want to let you know, I love you all.

G: Wow. Looks good!!! Happy to help!!:)

Ra: Enjoy working with you. End of conversation

Appendix 8: Transcript of Group 2 in the pilot study

Transcript of the conversation in the pilot study (Group 2)

Conversation started on Wednesday, May 4, 2016 (3.27 p.m.)

R: Hi, I am R from Nepal, a senior student from University of the Thai Chamber of Commerce studying BBA majoring in IBM.

A: Hello! My name is A and I am a 4th year student at Hanze UAS. I have studied at UTCC for one semester as an exchange student and this summer I will graduate in the Netherlands, majoring in IB & MS with specialization in International finance & accounting & minor in IBM.

Aj: Do you use smartphone in your learning process?

A: Yes, I believe it helps me find information faster.

Aj: How frequent?

R: Yes, I do use smartphone because it helps me in gathering wider view of any information.

Alex: I am using it everyday

R: Most of the time.

Aj: What do u think about ML? What is ML to u?

A: I think it helps with catching students' attention and learning in a more pleasant way that they are used to.

R: ML is something flexible…kind of getting relevant information……the easiest way to gaining information.

R: Also, you can form a community from it.

Appendix 8 (continue):

A: Means switching from traditional learning to self-development through own opinion and concepts. It provides flexibility in the way of thinking and gives room for shaping theory or future.

A: Also, studying together gives a better feeling than studying alone.

R: Basically, its always with you whenever you go. Like you don't have to have a book. One can share & get info from an island or a jungle. You don't have to particularly be in a class or a room together to share any info.

Aj: How do you source information using smartphone?

A: Google it or ask my network

R: The most easiest & common way is search engines. But its only unilateral. You don't have an opportunity to share what you have. You can only get what you want.

A: I guess it all depends on the kind of info I am looking for. If more specific info is needed, I would text a person who has precise K about the topic or specialized platform that discuss the topic

R: Lets say we create a group in any social network. We add members and share some relevant information and get from other members.

A: Texting with a person who has K gives you the opportunity for a 2 way communication. Whenever, I have a question, I asked the teacher about what I needed to know in order to complete my projects. Gives a better clarification on the situation compared to just googling it.

Appendix 8 (continue):

R: We did this for many of our bachelor courses. For e.g. IBM, where we had Line group chat to share information. Business Research Methodology where we had Facebook group to ask for any questions and share answers we know.

Aj: How do you transform information into knowledge that help in your learning? An example of how knowledge is transferred and acquired for good use.

R: Everything we get is just information but how we use that information is the actual knowledge we get. If we change the information into actions, then we can practice it from where we can acquire knowledge.

R: For example, everything we learn from different bachelor courses, we need to apply that to the real business world. When we make a business plan as a final report for any course, that's gaining information but if we go out to real market to get investment for our business that's gaining knowledge.

R: So, basically practice is the best source to acquire knowledge from information

A: See what is at the core of the info. See whether or not it has been used before. I collect the info and then try to use it as often as possible in order to get a better understanding of it. The more I apply it, the more I discover different ways in which info can be applied. And each way leads to different results. For example, now as I am graduating, I am trying to use the knowledge I gained in the business in order to get a job. Moreover, I

Appendix 8 (continue):

also used the knowledge I learned in uni during the jobs I had as an intern for different companies. Even though at the core, I was using the same knowledge, each organization was different and it needed to be adapted. Therefore, every job I had added knowledge to the domain and this improves my skills for the future.

Aj: So, what do you think of the interaction with your teachers? In & out of class?

R: Relationship with teachers is an important aspect but as an Asian, we were taught that teachers are always correct so we can't argue with them….. personally, I hesitated to ask any Qns or to answer bec' I was afraid I might be wrong. This way, we can't have any bond with the teachers. The information flow will be one sided. But if we are able to talk with them (teachers) in any other ways such as through messages or through group chat, then student will be more comfortable talking to teachers. For me, I feel comfortable sending an email to ask any questions or to have an appointment.

A: I can say that is very different in Europe compared to Asia. As an example in the Netherlands, every information I needed is provided during class or by official email only during the working hours of the teachers. Sometimes, no clarification is given but more things to think about. This being said, there is not much interaction outside the class. Sometimes, you can schedule a meeting but it is very less likely to help you. However, studying

Appendix 8 (continue):

in Asia at UTCC, for the IMC class we had Line group or FB group & teacher was also reachable via Line. So, whenever I had a Qn. I could text her & she would come back to me with a useful answer. This save me a lot of time & trouble bec' I could actually get real time info. This is of great value when there is a deadline attached to the situation.

R: For my final semester, I usually contact with my teacher through email because I hesitate to ask anything to him in class. Therefore, I feel its comfortable to ask him through email after class or out of class.

Aj: Do you think there is a difference between formal & informal interaction?

A: Ofc. Because sometimes informal info can provide you more in depth knowledge. Informal is easier to get hold on. And can save a lot of time.

R: If I want to have a detailed answer for any question then I would want to have a formal interaction with my teacher because if I email him/her or meet him/ her outside the class time then I think they have other works to do during that time and they might not be able to give a detailed answer. If it is about yes/ no answer or about to confirm something then informal interaction is easier.

A: Personally, informal info that I got from my teacher in Asia during exams helped a lot to prepare for the final exam bec' in the evening before the exam I still didn't understand a concept and thanks to the group in line the teacher made it clear last minute.

Appendix 8 (continue):

R: Last year, we had fund raising programs from out class which was fully out-of-class learning. Our regular classes were not hampered from that at all. Rather, it was very meaningful communication which was all done informally and it was a great success as well.

Aj: To bridge formal and informal learning, what do u think is needed?

A: Students live through texting. To bridge the wall that is keeping formal and informal apart is the willingness of teachers to be part of the virtual world.

A: Also the technology should be provided. Info provided formally should be reinforced informally.

Aj: Do u think you can effectively share knowledge through informal and formal learning?

R: Both teachers and students need to know the benefits of informal learning. Because people see informal learning as irrelevant and a waste of time. We still have the mind set of "in-class learning is the best way of gaining information" but we need to understand that there are more wider information in the open world.

A: Sure! This way the info can reach everyone. Also you can have access to different points of view and this helps ppl expand their horizons.

R: Yes! Both ways are effective. Both ways we present the information in class we have and by way we share our personal experience outside class. Both ways are effective.

Appendix 8 (continue):

Aj: Are u more willing to share knowledge formally or informally why?

A: Informally is easier and more comfortable. Gives me time to think and reflect over the knowledge I gained.

A: After this I can share the knowledge with the others and be confident about my answers

R: Personally, I want to share information informally because in class I have this awkward feeling of "I have to be correct else its embarrassing if I tell something wrong but if I am sharing anything I know or anything that I've experienced outside class then other people are also willing to correct me if I am wrong or support me if they agree with me.

Aj: Do you feel that you are more engaged in your learning using a mobile? By mean of more engage, I am referring to your ability to create idea knowledge not just remembering what you learn.

A: Absolutely, I sometimes even take notes on my mobile. Or if I am searching for something, I never stop at the first page I find. I read the matter on different pages and create my own opinion about the topic. This was my answer can be even better than the ones available online. Basically, I am building on others opinions in order to create my own.

R: Yes, because each and every group project that we do is shared informally among us. One recent example that I want to highlight is from our course "Contemporary Issues in International Business Management". We were

Appendix 8 (continue):

not taught from books or anywhere. We had to make business plan which was all external knowledge and which helped us to gain relevant knowledge about the current and future market.

A: Yes, and it will also make it more fun. Using what students like is the best way to get them engaged.

R: Yes, because nowadays, more and more young adults are engaged in technology and if they're to get knowledge from that then surely they will be more interested in learning more and improve their academic performance

Aj: Do you have anything which u would like to share which I have not asked?

R: Actually, there is still a mindset of having books as a best source of information. But in my opinion, there is more out of books and class. As an example, I want to focus on the donation campaign IMC students did for earthquake victims in Nepal. It wasn't mentioned anything in books but we did learn by doing the campaign about management and planning.

R: Also, about teamwork & working environment which are all factors of management.

A: I think teachers should be more open to change. They should understand the trends are changing and that they should become a part of the virtual world too. I think there should be understanding from both sides, the students and the teacher. It will also stop making the teacher seem as an enemy and creating a relationship will facilitate information to reach the students and

Appendix 8 (continue):

make them passionate about sth. This way students can get a real life experience and see that this things are not made to make their life harder, but just to make them prepared for a future career. If you dare to be different, you can change the world with innovative ideas.

R: We did everything outside class for example, communicating, planning and putting it into action. Everything was done outside class and through social media which helped us to coordinate everything.

Aj: Thank you both of you for the cooperation. Your insightful contribution in this research is most valuable.

A: Happy to help! If you need any more help let me know. Emoticon (smile)

Aj: Appreciate from my heart. Send emoticon (heart)

R: Its always an honor to help you! Send emoticon (angel)

Aj: Good conversion on mobile

Conversation started on Wednesday, May 4, 2016 (5.36 p.m.)

Appendix 9: Transcript of Group 3 in the pilot study

Transcript of the conversation in the pilot study (Group 3)

Conversation started on Monday, Jan 2, 2017 (1.16 p.m.)

Aj: Can you please introduce yourself?

Aj: This is a research interview with 2 Chinese students on the topic of ML.

J: My name is J, from China, 23 years old, just graduate from uni

Aj: J and S have been invited to join the discussion.

S: I am S, come from China. I am taken my bachelor degree in UTCC in Thailand.

Aj: Do you use mobile as part of your learning process?

Aj: How do you perceive ML? Do you see it as an effective learning tool? In what way, can you specify?

J: Of course, as it is a convenient way to expand and exchange knowledge. I usually ask and answer question via mobile rather than face to face.

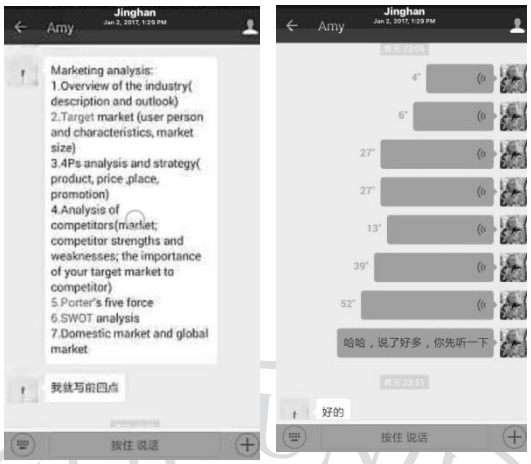
J: For eg. one day before my math final exam, I study until midnight & till got some problem with some difficult question. Everyone is sleeping at that moment, it is not possible to discuss with anyone face to face, but I really need someone to teach me, so I open Facebook & ask my friend from Canada bec' its afternoon there. It really solve my problem.

J: Yes, I partly use the mobile to search for the information & exchange idea & opinions among the group mate, is much convenience than on set taking.

Aj: Do you make good use of your network? What app do u usually use for interaction?

Appendix 9 (continue):

J:



Aj: Do you regulate the flow of discussion for collaborative learning?

S: Normally I use WeChat and Facebook towards different group members.

Aj: What are the criteria for selecting people to discuss learning problems?

Aj: Do you thin using mobile to interact help to increase your existing K?

S:

J: A good and fresh example just last night. We normally use WeChat because typing is a really exhausting when we need to type so many words. We can send audio and it is better than phone because there is a record and you can listen anytime you want. It is better than face to face communication sometimes to some degree.

Appendix 9 (continue):

Aj: Do you see yourself as an active mobile learner? How do you see participation in mobile discussion?

S: We don't have to set a time for the physical meeting in school. If we really have to use face to face talking we will use Skype! It really help me to wake up in the morning and avoid traffic to go to the half an hour meeting. It might take me two hours to reach the place.

J: I think the criteria for selecting are:1. The person have the knowledge that you need. 2. Person same level as me, so we can exchange. 3. Easy to contact, the frequent answer person.

J: For me, I am really active in ML. Haha. ML makes classroom everywhere. I can learning new things like everywhere.

Aj: How do you create new knowledge through co-creation using mobiles? Do you have a case experience where you share information out of your co-creation effort using mobiles?

S: I will stick with my mobile most everywhere. The mobile indeed help me a lot to absorb the new thing by chat with the friend and the information they deliver to me.

S: Like in a group project, different group members were in charge in different part…. I was taken care of the strategy part, and I suddenly found there have a report about this company's marketing selling. I just copy and pass the web for my group mate and told him this is bice source for our project. It really time saving and effective.

Appendix 9 (continue):

S: For the criteria, I don't think there should have clear criteria toward the learning problems. Because every single person will have different knowledge and idea. In the marketing strategy class, there have a classmate always absent in the class and he owns his hotel business. During the group project he share the different insight apart from our book. It more close to reality and meaningful. So, I think we don't need to set the criteria, however we have to set the problem first and do the opening discussion.

J: I've exchange to study in Peru for a semester. After I come back to and study in UTCC. In one of the subject for the mid-term exam, there is a question in mid term exam which makes lecture and all classmate doubt. The question is talking about the serious Zika disease in Peru and how government of Peru promote the preventive measures. The thing Peru government use match box as a communication tool to spread information to the public. Therefore, I send an email to my emailed my teacher in Peru, actually he is not really sure but just answer based on the situation in Peru, and his own understanding. When I discussed with him further, and share opinion with each other. Finally we got a good answer. After I got the good answer, I tell my classmate and teacher and everyone in class received brand new knowledge, actually, if I can make a phone call to my teacher in Peru is much more better and efficient, because email take time and some people do not check email frequently.

Appendix 9 (continue):

Aj: How important do you see interaction through mobile in the learning context?

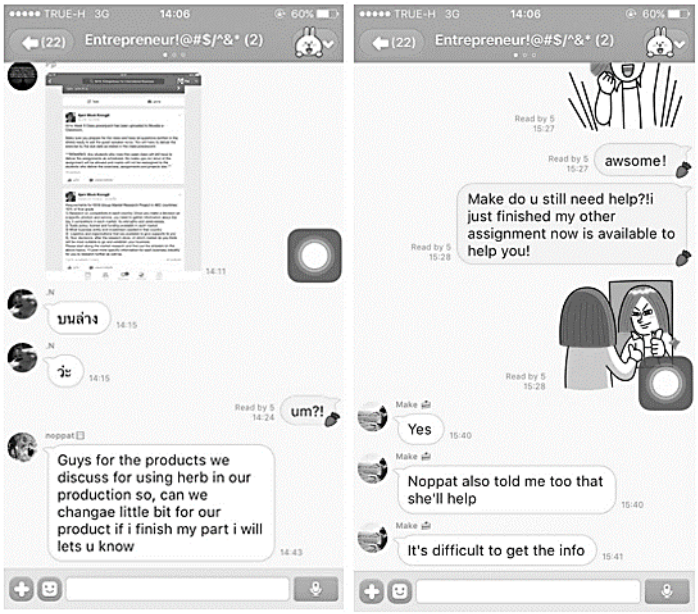
Aj: Do you see values out of your knowledge co-creation effort? How do you perceive this co-creation value? How does that impact your learning performance?

J: Mobile make things smooth. Hahaha, for eg. I really want to ask my teacher some question, but I don't dare to talk face to face. I can use mobile phone. There are so many people they are introvert in real life but extrovert in cyber world. So mobiles can seen as a stimulator of interaction.

S: I think I am DEDINITELY a mobile learner, I am taking the English program which apart from my native language. Many mobile application have provide the service to help me to translate the new vocabulary meanwhile I will keep that words in mind. The mobile discuss is really time and cost saving, most of my friend and classmate didn't live in center Bangkok, even in the morning they have wake up two or three hours advance to catch the transportation to go to class. Once the group leader sum the member to have a meeting and every members come from so far away and the whole meeting is meaningless it will real damage the members' motivation. Several times later we don't have physical discussion. I found that some friends just say in the physical discussion, they feel more comfortable to share in the mobile.

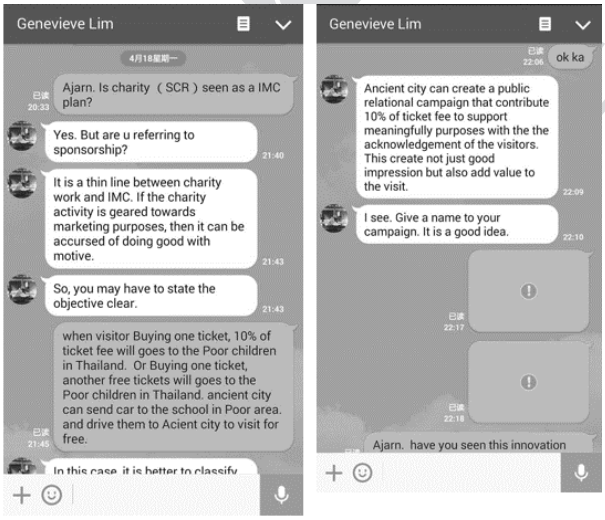
Appendix 9 (continue):

S:



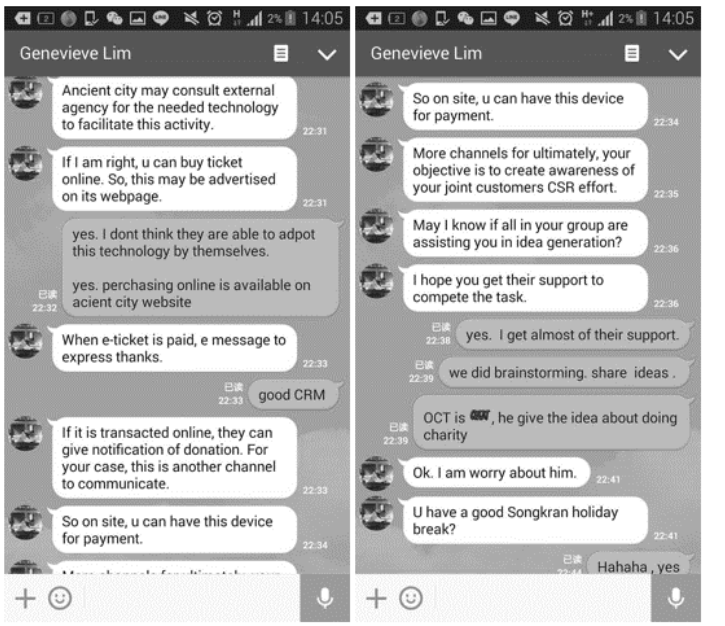
S: On the mobile discussion we can make sure every one can see it and we can trace back what we have discussed.

J:



Appendix 9 (continue):

J:

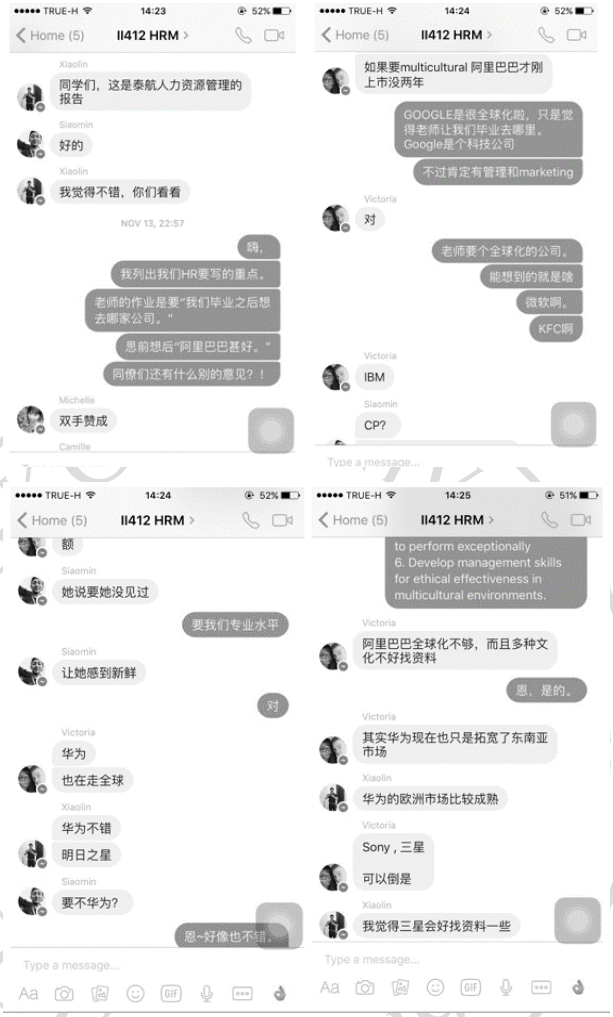


J: This is a typical case, actually I am not an introvert person. I am not shy to ask teacher question. But sometimes, I can not ask question during class due to the situation like some students have question to ask or I have to do something right after class. And some question I only have while I am doing my homework at home. The question that I do not know that I don't know. And mobile is really helpful in those case.

S: Here have a case which is my group member were discuss in Facebook, even whole group member have different level and every one dare to type out their opinions and whole team start to select the best option among the idea provided. It's really important in the group work, every one get involved in it.

Appendix 9 (continue):

S:

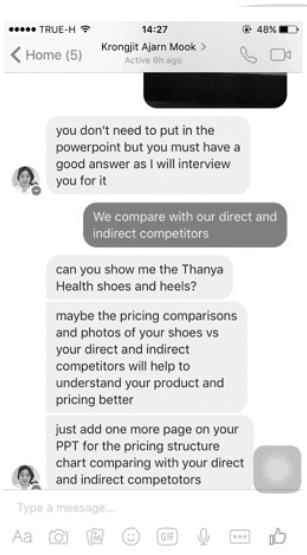


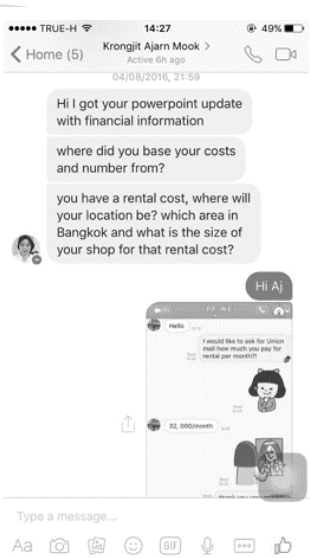
S:

Appendix 9 (continue):

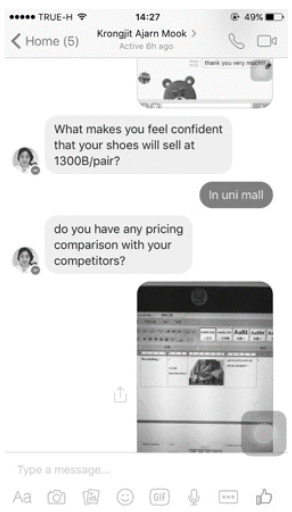
S: The mobile co-creation is valuable in terms of saving time and money. I can get the response immediately. There was a subject I was working in the report. I am sent my result to the Dr. Instant of sending back email to me, the Dr. message me in the Facebook. And ask me the specify question towards my report.

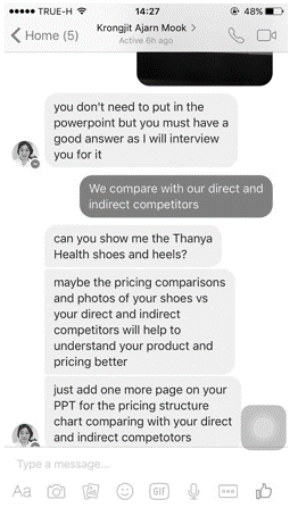
S:





S:





Appendix 9 (continue):

S: During this question asking, I got the deeper insight and the logical flow towards this project. It make me think twice and find out more proof to support my report.

J: How do I see value out of knowledge co-creation? First I would like to talk about the difference between ML& online learning. When I have a question, I go searching on the internet & I receive tons of result. But in this situation, I am just the receiver. I receive what (the) internet shows me. I have to assess the quality of the answers by myself. But for mobile, I can ask Qns & share my opinion immediately. If I think the answer is not 100% correct, I can tell others my opinion & correct it. In this case, we conduct interaction. I am not only a receiver but a provider as well. So, the value of co-creation is that we can learn skills – the skills of collecting, delivering, coding & decoding, distinguishing, garbage in garbage out the info. Another value is that 1+1>2. We conduct interaction, we share our ideas & those ideas may create new ideas to others & more new ideas are created. How do I perceive? I can feel the progress, now co-creation teaches me how to pick the key info out of communication. I know the important of info flow in & out. How to generate more ideas & make me study more efficient.

Appendix 9 (continue):

S: This kind of the co-creation, Q&A, opinions sharing and discuss like a new platform, I can absorb the knowledge more naturally which I even realize I am learning he new things through this way. And to compare to the regular class, I don't dare to ask teacher too much question because the lecturer time belongs to every classmate. I am so glad I born in this generation with mobiles or other devices, and I believe this way will enhance my point of view and knowledge absorb.:)

Conversation started on Monday, Jan 2, 2017 (2.52 p.m.)

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Appendix 10: Transcript of conversation in case study 1

Transcript of conversation: Case study 1 (On 4th April 2017. 6.06 PM to 6.58 PM)

Purpose and self-introducing:

Facilitator: Hello, LP1. I have created a group for you to assist me in my class project. My students will contact you via Line to learn from you.

LP1: Hi dear. Sure.

Facilitator: Thank you for agreeing to assist these lovely ladies and hopefully, you can share your insight to CSR activities which I may not be able to cover in class. Very soon, they will message you. I will inform them of the time difference. Many thanks.

LP1: Most welcome.

Facilitator: Send emoticon (love)

H joined the group

Facilitator: (Posted students picture). LP1, these students are from Myanmar, Thailand, Indonesia and Vietnam.

H: Our pleasure to know you Mrs. LP1. We hope you can spend a bit of your time with us on the interview about CSR.

C and JJ joined the group

LP1: I would be more than happy to. Just let (me) know when and we can arrange. All the best.

C: Hello, I am C.

H: Yes, now we are having class. So, we will discuss and let you know soon. Thank you so much.

Appendix 10 (continue):

B joined the group 8th April 2017 (Negotiating)

JJ: Good evening, Ms. LP1. How are you today? Have you been busy? Is it possible to spare some of your time tomorrow evening for us for the CSR interview? Please kindly let us know what time will you be available? We are available around 5 PM (Bangkok time) which is around 1 PM in Bahrain. If you are busy tomorrow, please kindly let us know when will you be available. Thank you.

LP1: Hello, unfortunately tomorrow, I am busy at that time. But Monday is OK. Let me know if that suits you.

Facilitator: Send emoticon (Love)

C: What time do you prefer Ms. LP1?

JJ: May I know what time will you be free on Monday?

LP1: For your time is good. Even 3 is good. Let me know what suits you.

C: How about 5 PM in Bangkok and 1 PM in Bahrain? Would it be okay?

LP1: Then let's make it Wednesday at 5 PM your time.

C: Okay. Have a good night.

LP1: You too.

12th April 2017 (Following instruction on MIM- self-regulation effort)

JJ: Good afternoon, ma LP1. How are you today.

H: Good afternoon!

B: Good afternoon (emoticon: smile)

LP1: Hello girls. Any idea how long this will be?

Appendix 10 (continue):

JJ: Hello. Around 30 minutes or so. Will it be alright? (emoticon: smile)

LP1: Because, I am in the car. I don't know if you will hear me ok.

JJ: Awww …. I see. Are you driving?

LP1: Yes, but it is ok. I am on Bluetooth.

JJ: Because we are ok with typing if you are not driving. (Following instruction: texting format)

LP1: [Voice call started]

Casey: Better chatting Ma'am. Its ok. We can wait for you when you have arrived (your destination). Send emoticon (smile) (Affirming the texting format)

Facilitator: Girls, Ms. LP1 is driving. Can you ladies give her half an hour to reach home first? Thank you, Casey, for asking.

H: Yes, we are willing to wait.

Facilitator: Thank you

B: Yes.

C: Yes. Don't call now. It is dangerous.[Group Call ended]

LP1: Hi, at home.

H: Hi, Ms. LP1. Should we start the interview now?

LP1: Yes, please.

H: First of all, thank you so much for giving us a chance to talk with you.

LP1: My pleasure.

H: Could you tell us which non-profit organization you are from? *(Q1)*

LP1: Sorry for the delay.

Appendix 10 (continue):

H: Never mind Ms. LP1.

LP1: Rotary club

JJ: Thank.

H: Can you tell us more about the club? *(Q2)*

LP1: It is an international club with local chapters. There are three in Bahrain. We as members meet every week on Sunday for lunch. We discuss local needs of the society and try to help as much as we can. We are from different professional sectors of the society.

C: Could you tell us what (how) does this organization have influenced or changed your perception about ethics? *(Q3)*

LP1: We try to give back to society by helping underprivileged children or cancer patients or autism or disabled.

H: That is so great. So, how long have you been in the club? *(Q4)*

LP1: 7 years

JJ: That is a long time.

H: And what typical activities do you organize?

LP1: I work alongside very experienced and professional people. I enjoy it and enjoy helping the society.

C: I see. That sounds amazing Ma'am.

B: Which event is the most interesting? *(Q5)*

LP1: One example is, we are arranging lunching for 600 labors on Labor Day.

H: That is my birthday LOL. I am sorry (send emoticon: smile)

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Appendix 10 (continue):

LP1: And we participate by distributing the food. Send emoticon (smile)

B: So great

LP1: We of course pay for the food also.

B: And which event was most rewarding? *(Q6)*

LP1: Taking orphans on a day of fun. With activities such as bowling and ice skating.

JJ: Has anyone (donor) pay for food on special day? E.g. Labor Day*(Q7)*

LP1: No, we pay from the club. Sometimes we get sponsors for different activities.

JJ: Could you also please tell us what motivate you to stay in the work for 7 years? *(Q8)*

LP1: I like the environment of the club & members & how we arrange activities & participate in them. It gives me happiness & to see others happy.

JJ: Happiness is seeing other feel happy by your effort. Emoticon (smile)

LP1: Yes. Send emoticon (smile)

H: Yes, I agree. Send emoticon (smile) So, have you met any difficulties during organizing these kinds of events? *(Q9)*

LP1: Sure. But with patience and good heart everything turns out ok at the end.

H: Could you share with us some examples? *(Q10)*

C: What were the barriers for you when you did this? *(Q11)*

LP1: People not agreeing on the arrangements. But most of the time, the members look at the goal and try to compromise.

Appendix 10 (continue):

C: I see. How did you and others deal with this? (emoticon:smile) *(Q12)*

LP1: By trying to meet half way.

JJ: Our professor told us that you are a professional fundraiser and you persuade a lot of people to contribute to good deeds you are doing? And we wonder is there any other financial source to run the club and to sponsor some events and activities? *(Q13)*

LP1: It is run by the membership fees, the donations and the funds we raised in different activities.

B: And how do you encourage people to join your work? *(Q14)*

LP1: Some organizations also sponsor.

H: As you said, now you have three clubs, have you ever thought of expanding the clubs by some marketing activities so that you can bring good causes to more people in further areas? *(Q15)*

LP1: We are in a very small pace and already the three clubs are enough. Send emoticon (smile)

B: I see

H: Emoticon (smile). I got it.

JJ: I see….so are there any plans that how many events and activities in which fields the club will sponsor within a year? *(Q16)*

LP1: Yes. We always have one major event in a year and plan a few smaller ones along the way.

JJ: We heard some of your experience on a cruise (while doing fundraising).

Appendix 10 (continue):

H: Then, how you can see your work impact the local society? *(Q17)*

Facilitator: Can you provide some pictures of the activities organized by your club for better understanding?

LP1: Sure, I will send a few pictures by email to gene.

Facilitator: You have many interesting events that signifies how you value people and diversity in your society.

JJ: If any club member is to go out of the country for fundraising, does the club pat for the fares, accommodation and things that incur during the trip? *(Q18)*

LP1: I didn't understand the question about the cruise?

Facilitator: Thank. LP1.

LP1: No, all our trips are self-paid because the money of the club is from the charity work only. And we raise funds locally only.

JJ: I got what you mean.

H: How about the impact Mrs. LP1? *(Q19)*

LP1: What impact?

B: The impact of your work? *(Q20)*

H: Like how your work impact the society? *(Q21)*

C: I wanna (to) know, whether in the future will you make the same plan again? *(Q22)*

Appendix 10 (continue):

LP1: There are activities that we do every year. Like distribute food boxes with rice, sugar and cooking oil to underprivileged families during the month of Ramadan in which we fast. So, families look forward to the boxes every year. Is that all? Do you have any more questions?

Facilitator: Could you please advise what these girls can do to contribute to their societies in CSR?

LP1: Of course.

Facilitator: Send emoticon (love)

LP1: They can always ask in their communities of people who need help and either join them to help or get a group to do the needful.

B: So, what are the lessons you had learned and would like to share? *(Q23)*

JJ: Thank you so much for your time & answers. We really appreciate it.

C: Thank you very much for your time to answer our questions. Ma'am, I hope we can see each other in the future.

Facilitator: Yes, indeed.

LP1: Also, another one is to tutor children who cannot afford schooling or private tutoring.

H: Yes. Sometimes, we just think about huge things and forget that we can help people with very little things.

Facilitator: Thank you for your time and I believe the girls have learned much more from you through the interaction on mobile.

LP1: Exactly. It does not have to be in a big scale.

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Appendix 10 (continue):

H: I tried tutoring poor children before. Such a great experience. Thank you so much for your time sharing with us Ms. LP1.

LP1: Wonderful.

B: Thank you so much. I learned a lot of knowledge. Send emoticon (happy)

LP1: Thank you all for including me in your survey. I enjoyed it.

JJ: Please let us know if you ever come to Bangkok. We would like to meet you personally too.

Facilitator: Thanks a lot

LP1: I would love to meet you all too.

Facilitator: Thank you ladies for your effort in learning.

LP1: Thanks Facilitator.

Facilitator: Will arrange when you visit Bangkok again.

H: Our pleasures, Ajarn.

C: Yes, thank you and see you in the future.

Facilitator: Send emoticon (love)

17th April 2017

C: Hello, Ms. LP1. May I ask whether have you sent the pictures to Mrs. Facilitator? Because we need to write a report. Hehe.

LP1 : Sorry girls. Forgot. Will do, in half hours. Send pictures

JaJa: Thank, Ms. LP1. And Happy belated Easter to you.

Facilitator: Send emoticon (love)

JJ: Wowwwww…… Are the people in the last photo club's members?

Appendix 10 (continue):

LP1: Yes. This was in one of our conferences.

JJ: I see. Thank you for these amazing photos, Ms. LP1.

LP1: Good luck with your project.

Facilitator: Send emoticon (love)

C: Thank you Ms. LP1. [send file: self-report on ethical perception based on Ms. LP1's experience).

H: OK. Ajarn ka.

Facilitator: Great.

19th April 2017 : Facilitator posted 11 pictures & 1 video on the group line while the students were presenting in class.

C: Send emoticon (Love)

Facilitator: Well done. Thank you Ms. LP1 very much.

LP1: Send emoticon (hooray). Congrats and most welcome.

H: Thank you very much, Ms. LP1. Send emoticon (Clapping hand)

LP1: Send emoticon (Thumb up)

C: Thank you. Send emoticon (Love)

JJ: Thank you. Ms. LP1 for the help.

LP1: Send emoticon (Love)

B: Thank you so much. Send emoticon (smile)

LP1: Send emoticon (Good Job)

Facilitator: Send video of presentation.

H: Send emoticon (giggling) End of group communication

Appendix 11: Transcript of conversation in case study 1

Transcript of conversation in case study 1 and Feedback from participants after presentation in class.

12th April 2017 (C)

Facilitator: Well done

C: Hahaha thank you teacher. Send emoticon (hugging)

Facilitator: Happy with the learning?

C: Yes, sure. But if meet in real (person) would be better. Haha.

End of conversation

12th April 2017 (JaJa)

Facilitator: Good questioning by you.

JJ: Thank you, Ajarn

Facilitator: You have done extremely well in this interview.

JJ: Did I? Send emoticon (pleasing)

Facilitator: Yes. I followed through the whole interview.

JJ: Thanks to you, Ajarn. I won't be able to question without your guidance.

Facilitator: You have performed well. Now you understand the important of using mobile phone and interaction in your learning?

JJ: Yes.

Facilitator: One-hour discussion and all learning is captured. You can review and further understand the learning. Right? Hahahaha

JJ: It did give me a lot of confusion on our first online discussion because I can't catch up with the flow. Now, I think I am already getting used to it and no more confusion.

Appendix 11 (continue):

Facilitator: All learning starts with adaptation.

JJ: Agree!

Facilitator: That is why can't learn simple stuff. Bec' it doesn't make you think out of your box. Now you can compile your report easily with proof & credibility.

JJ: Send emoticon (singing)

End of conversation

12th April 2017 (Helen)

Facilitator: Well done all. Are you girls still together?

H: No, Ajarn. We separated from this afternoon. Send emoticon (smile)

Facilitator: Happy with the discussion?

H: Yes. I really enjoyed.

Facilitator: See how effective is ML!

H: Learn a lot from her. Yes. Global study. What she is doing is so significant.

Facilitator: Yes. Help a lot of people.

H: Yes. Ajarn. The locals there are so lucky to have them. Smile emoticon

Facilitator: They are very committed to their community. Muslim belief in brotherhood.

H: Yes. Worth learning.

Facilitator: Our extended conversation from the interview is also learning. Hahaha

H: Hahahah. Yes, Ajarn. So fun!

Appendix 11 (continue):

Facilitator: Me too. Enjoying the chat.

H: Even though our course is hard, with your effort and because of you, I so enjoy. Send emoticon (smile)

Facilitator: Thank you.

H: Thank you, Ajarn.

Facilitator: That is how learning should be holistic. See the forest and not just a tree.

H: Agreed. Ajarn. Send emoticon (smile)

End of conversation

12th April 2017 (B)

Facilitator: Well done! B

B: Yea, Ajarn. Thank you so much. Send emoticon (Smile)

Facilitator: Very good. You have asked good questions. Impressed. Good work.

B: Thank you. ka Ajarn. Send emoticon (Love)

Facilitator: Luv you for being brave to chat.

B: Because of you. I love you too ka.

Facilitator: Always try and do your best. Let people hear or read your voice and words. Proud of you. Fighting! B.

B: Thank you so much. Ajarn.

Facilitator: Send emoticon (Great) / End of conversation

Appendix 12: Transcript of conversation in case study 2

Transcript of the conversation in case study 2

The conversation in case study 2 for the 1st CAR (date and time)

13th April 2017 7.45 p.m. – 7.51 p.m.

5.30 p.m. – 6.12 p.m.

14th April 2017 10.20 a.m. – 10.26 a.m.

16th April 2017 9.06 a.m.- 9.18 a.m.

17th April 2017 1.51 p.m.– 2.18 p.m.

P: Good afternoon. I have discussed with Khun LP2. I have got good information from her to share with you guys. If you have questions or anything to ask, you may ask her.

P send MIM message by paste screen.

The following comprising the messaging & interaction of the interview:

P: Good evening LP2. My name is P. I am a second-year student. This (interview) is one (of the) project from Ethic (for Business and Everyday) course. I would like to interview you about (your initiative) in designing clothes for disabled people. (My) first question (is) can you please provide us with a brief introduction of yourself. Teacher Genevieve advises me to do this interview with you? *(Q1)*

LP2: Hi there! Sure! Sorry for the late reply. For question 1, my name is LP2 Tan. I am 29 years old this year. I have a pair of 18 months' twins and a 3-month baby in my belly now. I started the online fashion store, MLB when I was pregnant with my twins. Because my morning sickness was so

Appendix 12 (continue):

bad, I had to leave my job with a finance publication. So, I needed something that I could work from home mostly as I was vomiting and getting very tired with my pregnancy.

P: That's okay. So, next question, what do you do for a profession? *(Q2)*

LP2: Currently, I work as a business development manager at a Maritime Measurement Consultancy. Although, I major in Finance and was in the finance industry before I joined shipping in 2014.

P: We heard that you have designed clothes for the disabled. Can you tell us, how did you become involved with this project? *(Q3)*

LP2: After I got pregnant, doctor told me to do a scan to see if baby is down syndrome. It was a very common test in Singapore and doctors urge every mom to go for it. Then, it struck me that if it is tested to be Down syndrome, would I abort the baby or not. So, I thought that the moms that still went ahead with the pregnancy even after knowing baby has Down syndrome are very amazing and commendable. Moms are always scrutinized for whatever we do. Whether we breastfeed, whether we send to school or not etc.

P: Is there a difference making clothes for normal people and disabled people? *(Q4)*

LP2: No one likes to see them. So, I wanna spread the awareness that they are like anyone of us. Not exactly. They like to be pretty too.

Appendix 12 (continue):

P: How do you know the clothes designed are suitable for the disabled? *(Q5)* And how long do you take to make these clothes? *(Q6)*We want to ask more about what encourage you to take part in this CSR event? *(Q7)*

LP2: How do you know the clothes designed are suitable for the disabled and how long do you take to make these clothes? Because I want the clothes to fit the models so, I took all of their measurements. Like shoulders, bust, waist, hip etc. And I opt for clothes which are more covered up. I asked what do they like to wear, their favorite colors and such. And I also converse with them first during the audition to know them and their characters. So, I know roughly what would fit them!

P: We want to ask more about what encourage you to take part in this CSR event? *(Q8)*

LP2: It is about giving back to the society. When we go to Instagram or other social media network, we only see the beautiful side. The super-hot models and their flawless lifestyles. But on the flipside, we have people who are not so fortunate. We can earn a lot and give back monetarily or we can earn enough and do more for them. Action speaks louder cuz they feel it immediately. Money are usually split into many different things like construction, food, etc. So, how much benefits directly?

P: Can you tell us more about what do you wish to achieve in this CSR activity? *(Q9)*

Appendix 12 (continue):

LP2: To instill confidence in these Down syndrome individuals. To show that they are not much of a difference from us and we should not view them differently. All of us want to be pretty so, fashion should be inclusive of whoever.

P: Final question, can you briefly share with us the process it involved to complete this CSR activity? *(Q10)* And share some pictures (the clothes) because our group have to present to teacher and classmates.

LP2: We went through an audition for the girls then we schedule for their photoshoot monthly. Thereafter, we post their photos online. Do you have FB? Can you search mlb.sg? There are many pictures there. (Link sent)

P: Yes, I have. Thank you so much love for giving your time for interview to our project. Our project could not have done without you.

With the end of the posting of the online interview, interaction continued in the group line with the facilitator and group members.

P: She gives us the website. I saw it and it is very interesting. We have already done our interview.

Facilitator: I will try and get pics (for your group)

P: OK.

Facilitator: Ms. LP2 is unwell today. But she will try to answer your Email. Good to explore with direction given na.

P: OK. Send pictures of the disabled in designer clothes. I have too. (It is) so beautiful.

Appendix 12 (continue):

Facilitator: Great. Yes. You see, that is how we can do to make people feel confidence and beautiful.

P: Yes, it is very suitable on them.

Facilitator: It is really meaningful work for LP2. When you do SR (social responsibility), it can be both personal and corporate. The world is made up of different people. It doesn't matter if they are able or disabled. We should not stereotype them and think they can't be beautiful like anyone else of their age.

P: Emoticon (Smile)

Facilitator: For this CSR case, personally, it is very meaningful. LP2 has done more than anyone of us has done. Giving donation is too simple an act. A good act but more can be and should be done. I truly hope your group has learned the essence of her case. Good luck to your presentation tomorrow. Learning should not be dependent. Explore and try to see more meaning out of people's work.

P: Thank you so much ka Ajarn for helping us.

Facilitator: As for ML, you have expose to this form of learning. You learn from your mistake in organizing your team. You must ensure group communication. By yourself, it is not collaborative. Collaborative learning is very powerful. Team management at work is a must. But, I am glad we have included LP2 into your understanding and learning.

Appendix 12 (continue):

P: OK.

Facilitator: Thank you LP2. This learning would not be possible without your willingness to interact. I hope you get well fast. Will post pictures for you of the presentation by P, yin and Ming.

I: Thank you Ajarn.

Facilitator posted pictures of the presentation by the group on 19th April 2017.

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Appendix 13: Transcript of conversation in case study 3

Transcript of the conversation in case study 3

Conversation (4.23 p.m. – 5.23 p.m./ 1-hour duration) 16th April 2017

LP3: Hello, everyone. Thanks for the interview and having me (to) discuss with you (about) my CSR activities. What would you like to learn from me in this area? *(Qn.A)*

U: Send emoticon (shed a tear)

A: Yea

LP3: Would you introduce yourself to me first? *(Q1)*

A: Hello, my name is A. I come from China.

LP3: Hi, Nice to chat with you.

A: I am very honored to interview you in such a hot day.

LP3: Yes, it is. What do you know about CSR? *(Qn.B)*

A: The 1st question, I would like to ask is that, how was your group formed? *(Q2)*

LP3: Have you ever join in such activity? *(Qn.C)*

A: It is the charity activities. Yes. I have.

LP3: Well, we are a group of business retailers of Chevron Thailand. In the past, we worked independently and because business was always busy, we did not have much social activities. That is why, my company organized CSR events for retailers to meet to do good deeds together. We came from different petrol stations located in different apart of Thailand. However, when all retailers from Thailand met, we did not feel close because of distance. But as years

Appendix 13 (continue):

went by, staffs at Chevron retired, we met on other social events and we have a respected ex-company friend who knew many places in Thailand and he suggested that we should get a small group and do CSR together. That is how we stated the Do-Good-Deed Group.

A: Therefore, you formed your small group, right?

LP3: Send picture of group leader in one of CSR event. This is our group leader.

A: That is great.

LP3: He used to be the regional manager at Chevron so, he travelled extensively. He still has connection with the local people. So, he always asked where help is needed. Then he does survey of the place and tell the group.

A: So, we (are) also interest in what good deeds your group (have) done and where have your group been (to)? *(Q3)*

LP3: So far you understand how we operate our group? *(Qn.D)* Many places (visited).

A: Understood completely.

LP3: We do charity and then travel to strengthen our friendship. For years, we focused on children. We go to schools in rural area or boarder schools. We always ask what the school needed. The list is very long. So, we encourage more friends to join (us). I can share some pictures with you. Posted 5 pictures. This is just one school.

Appendix 13 (continue):

A: I love these pictures so much. Shows a sense of warm.

LP3: We usually ask the locals to help us prepare food for the children. Locals are happy to be part of our visit. What we do is to ask the local Chevron service station owner to help us to get with food preparation. But sometimes, our headquarter staffs also volunteered to help to cook. We still maintain close relationship with the mother company. Because, we need all help. Send picture of Chevron staff together in a CSR activity. Not only we help students, we also found out something during these few years of CSR with schools. Can you make a guess what we have discovered? *(Qn.E)*

LP3: Send picture of Chevron service station. By the way, this is how our station look like. Want to make a good guess? *(Qn.F)* We have found that many teachers in these schools are paid very low.

A: Oh, really!

LP3: We give each student 100 baht to help them. And we decided that teachers also need a lot of help. So, we give teachers 2000 baht each to motivate them to work and help the children more. Yes, some also indebted.

A: So motivated!

Appendix 13 (continue):

LP3: Teachers are very happy when we think for them too. When we leave the area, our local Chevron retailer and company's salesman (also) help to keep us updated on the progress of the school. When you have feedback, it is good. Send two pictures of the leader in school that received help from the group.

A: Feedback is the best payback.

LP3: Yes. That is why our company staffs in the local area is helpful.

A: What else, what is so special in your group? *(Q4)*

LP3: Send two pictures of cash donation to rural temple. Strength to do good for society (special about the group). We think we have benefited from making a good income from our customers. It is good we return back to society. What do you think? *(Qn.G)* You are from a business school right. Do you agree? *(Qn.H)*

A: I can't agree more.

LP3: Do you have any more questions to ask? *(Qn.I)*

A: I heard that your group is a very small group, right? *(Q5)*How many members do you have and what is the benefits? *(Q6)*

LP3: About 30 people now. Actually, 7-8 families. Our children grow up with the group as the years passed. Too big is not very good. We use to have a big group & we realized too many people, too many ideas.

A: This kind of spirit will pass on to the next younger generation? *(Q7)*

Appendix 13 (continue):

LP3: Hard to satisfy everyone wish. Yes, we hope so. But again, we don't force our children as we know they too have their ways to contribute to society. I have an advice for you guys.

A: OK.

LP3: When you do CSR, diversity in activity is necessary.

A: You mean diversity ideas? *(Q8)*

LP3: When you visit different places, and see different needs in society, you learn much more. We were there in the south of Thailand once to help in Buddha building activity.

A: Experience is the best teacher.

LP3: You know, south is a dangerous place.

A: Yeah.

LP3: When we were there (Yala), we saw soldiers with weapons safeguarding the streets and tourists.

A: So horrible!

LP3: (At) Pattani. There are actually many Buddhists in that region too. So, to build a new tourist attraction area, we contributed in the building of a huge Buddha statute on top of a high mountain. If we were afraid of terrorism and allowed them to control others' lives, then it is (would be) bad. So, we think differently. We want to help to bring more tourists there and do (more) with development. The living environment will also improve.

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Appendix 13 (continue):

A: It must be dangerous.

LP3: That is what I meant by diversity in CSR activity.

A: OK.

LP3: No. We have to show others that the place is there for all.

W: Got (it). Sorry for late.

LP3: If we all avoid, then, it will make the situation in the south worst. CSR mission is for the wellbeing of the people in the long run- better future for all. I hope you have learned from our conversation. Have you gain new ideas? *(Qn.J)* Have new knowledge about the CSR concept? *(Qn.K)* I hope you do. Do you wish to ask any question? *(Qn.L)* If not, I shall stop here.

A: The last question. What make your group a successful CSR team? I mean, what support your group? *(Q9)*

W: Yes.

A: (What) Is the common objective? *(Q10)*

LP3: There are few reasons for the group to keep going. First, understanding the purpose of the group in CSR. Second, trusting and value friendship. Each CSR activities involves more than half a million baht. So, we must trust the group in the handling of the money collected. Third, heart to give.

A: Wow. I think we all should learn from your group.

W: How about government? *(Q11)*

Appendix 13 (continue):

LP3: Well, we aren't really for profit but we believe in Buddhism and be in harmony with people we love and help people and environment for a better future.

W: Support the group? Or don't care. *(Q12)*

LP3: There is no government involvement.

A: I see.

W: OK.

LP3: We are a social group. Privately organized social group.

W: Charity

A: Very happy to chat with you, we did learn many things. Thanking you for giving us (the) chance to interview you.

LP3: As we comprise of older citizens, we are not so much onto social media. So, we don't do much publicity.

A: Sometimes do not publicity is a good thing.

LP3: You are welcome. Hope you have learned more and new things from our experiences. Thank you. If you want to ask any question, you can line me again. / End of conversation

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Appendix 14: Student's self-assessment reports in 1st CAR

Self-assessment reports (1st CAR)

(Student: C)

"After knowing the experiences of Mrs. LP1, I would summarize what I have learnt from her is that we should give what we have to help those who are not lucky enough due to their disabilities. We should help to create a beautiful world for them by assisting them in the fields where necessary. Helping people also increase our kindness and we will be able to handle problems in the future. This organization has influenced me to be a better person and create a better world for our family.

About ML, I think this is an efficient way to learn and communicate with other members because we can have interactions in everywhere. It does not need to meet face to face. We can do it by online and I think it makes everything easier. Online also help us to get the attachments easier. For example, Ms LP1 has sent us the photos when she was in the charity event. What I mean is that everything would be easier through ML."

Appendix 15: Student's self-assessment reports in 1st CAR

Self-assessment reports (1st CAR)

(Student: H)

"I have learned a lot from the interview with Mrs. LP1. Happiness is to see people around us happy. What she and her club members are doing is not even in a big scale, but it could help lots of people in the area. This means we can do CSR, we can do volunteer or charity, we can help our society with very little things, which sometimes we have not thought about or we think doing CSR is something very big and huge.

Imagine if in every corner in the world, there is an appearance of people like Mrs. LP1's club members, how better and greater our planet will be. This motivates me to be more responsible with people around me and my communities. Now I do not have much power or conditions, but I have been starting with penny things, and I believe that little by little, day by day, I can contribute to changing the world for better.

In terms of ML, in my opinion, this is a great tool for us to expand our understanding. Studying in classes is not enough. What we need more is the skills that we can apply after we really encounter the real life. Through this tool, we can somehow collect knowledge from all over the world, know more people, understand them, and learn lessons from what they do. Technologies have been becoming an indispensable part of the modern life, so the more we get used to them, the more we get benefit from them as well."

Appendix 16: Student's self-assessment reports in 1st CAR

Self-assessment reports (1st CAR)

(Student: B)

"I have learned a lot of this interview because it is about charity activities that help people who are in need of support. The charity is not only about donating money but also doing whatever that can help children. For example, in this case, she helped the children by giving foods, taking them to do the activities of fun. Doing the charity like this is not boring at all because by helping children, you will have and get the great experiences in a part of your life. But sometimes you have to keep patient and always think that you are making them happy and you will feel happy in your life too.

In the part of ML, I think that ML can be advantageous in many ways. Such as easily communicating with others, getting to know more each other and learning whenever and wherever. Additionally, it has features and functionality for supporting learners. It is also convenient because it uses technology for learning and you can just go to the internet and learn from it."

Appendix 17: Student's self-assessment reports in 1st CAR

Self-assessment reports (1st CAR)

(Student: JJ)

"Nowadays, not only do the big firms focus on CSR but also do Non-profit organizations put notable effort to maximize the benefits they could contribute to the society and minimize the impacts they cause on society. It is not easy to become a corporate citizen and involving in CSR activities is even harder. It is not a surprise if a company has the ability to popularize their CSR engagement as they have allocated some profit for CSR project. However, it is quite challenging for NGOs to organize CSR activities, Rotary club, for instance. The club, funded locally, has stood for the test of times by giving and providing help to the community. A chat with Mrs. LP1, a professional fundraiser for Rotary club events, has allowed me to see the commitment and solidarity Rotary club members share as a whole. With a shared identity, club members usually sit together every Sunday for lunch to discuss what the society needs and how they could they be helped. Most importantly, I also learnt that, as an individual, I can always be a miracle in other people's lives through simple actions such as talking to them, playing with them and helping them with their homework.

As a saying goes, "There is a way when there is a will. Due to the advanced technology, our daily lives barely pass without using any electronic devices particularly using smartphones to empower and facilitate better education. If we can make use of it wisely, the benefits ML presents is unlimited. First of all,

Appendix 17 (continue):

ML breaks down all physical barriers and connect people all over the world and which enable us to reach the person we want within a click-just like the online discussion we did with Mrs. LP1.

The other benefit is it saves the resources: time, money and energy. However, the downside of it from my personal experience was ML will only flow smooth with stable internet connection and active participation from participants. Flexibility and adaptation to technology-driven online environment is required in order to avoid misinterpretation and overloading of information during the first couples of discussions.

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Appendix 18: Transcript of Participant 1 (P1)

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
This task is unlike any of my other assignments because it is real sense making of the way people live and work where we do not have the chance to expose to	Real situation/ Sense making	Authenticity of learning	P1 was able to differentiate traditional & innovative learning approaches. Other assignments student mentioned referred to the learning method that focused on knowledge memorizing & reproduction, characterized by lack of personal involvement in the learning activity. This kind of environment did not promote social interaction, collaboration, problem solving & critical thinking - lacking in "real sense making P1 reported that learning using tablet devices makes learning more interesting.P1 associated social learning using mobiles as new & authentic. P1 realized the added value of using the tables to access to the multimedia.P1 was able to integrate the tablet in a meaningful manner to allow deep learning to take place. She saw it as a chance to be expose to real learning environment & new knowledge gained.
I am rather interested in this project about Asean - the working and living experiences of people in Asean.	Interested in the project	Awareness of task	
This is a new knowledge for me.	New learning	New knowledge	
My understanding of Asean is still restricted.	Restrictive	Knowledge gap	
It would take a long time to really understand these different lifestyle and culture at work.	Time taking process	Time management	
Using mobile is effective way to "wave" help. It is free and the only thing I have to give is the time to share with "Friends"	Giving time		P1 felt that the mobile technology facilitated learning as it was "direct" & less time consuming learning technique. Although it came with no cost, P1 reckoned that she had to share his time interacting. Investing one's time was an acceptable exchange for info. Learning partners were viewed as 'Friends'.
However, I am happy to take this challenge to interact with people to reach out and connect to the way they live.	Virtual interaction	Cross boundary/ Enacting strategies/ Regulated learning	Identification process. An approach that was perceived as a challenging task. Identifying the right person to assist in the K acquisition. Interesting, student did not see the process as a problem but admitting that it was a 'challenge' to 'interact', 'reach out' & 'connect'.

Appendix 18 (continue):

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
I have never seriously think that 'texting' can be educational.	Texting	Social learning/ Enacting strategies	A new learning culture "texting" as in writing and speaking in learning
I believe it is possible that by interacting with individuals from other ASEAN countries, I can enhance my own learning of ASEAN as a region	Social interaction enhances learning		P1 believed that social ML allowed her to gain insights into people experiences regardless of distance.
In this assignment, I have learned to work with people in & outside of my classroom.	In and outside of classroom	Learning boundary	P1 seemingly receptive to cross boundary and out-of-class learning.
In class I came to know more about Asean.	In-class learning	Mobile collaborative Learning techniques/ Metacognitive knowledge	Mobile devices enabled the student to approach subject of interest and the ML process allowed her to acquire knowledge and she could quickly pick up on key concepts and skills. As such, she felt that she had 'came to know more about Asean'.
In discussion, there is no table to divide us. We need to talk to find out differences and similarities with the information I obtained based on our texting.	No barrier/ Need to talk / knowledge repositories		No table to divide us' – P1realized the need for discussion to build up their knowledge base/ storage and to reify their understanding of people's experiences. HOW: When student engaged in the handling process of the information, internalization took place. Reflecting on her interaction, she moved on to evaluate the unstructured group data into categories (differences and similarities) that allowed effective sense making as mentioned earlier. This process ended with the gain of wisdom by the individual not just enhancing one's 'own learning' but also 'working with people in and outside' of the classroom. The joint effort also demonstrated the creation of a networks of knowledge as suggested by Alavi & Leidner (2001).

Appendix 18 (continue):

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
When I was told to do an assignment using my phone, I thought it is different and should not be difficult because texting is commonly used.	Texting is common	Develop learning friendship	Students are familiar and receptive to using technology for learning and that they are aware of these new learning tools such as text, illustration, and audio and visual recordings. These tools provide students the chance to have a holistic learning experience.
Discussion actually breaks the ice in class.	ice-breaking		Evidence from the students report indicated that she was excited and engaged with the discussion and debate in class.This sense of togetherness was created using the mobile devices. They were able to work easily together.
We categorized our findings according to working style and living style. These were what we found out together.	Group work in class		Students engaged in discussion among themselves to share and develop new perspectives of their learning. They co-created common understanding based on the information provided by the external learning partners. The reflection mechanism enhanced learning practices. The metaphoric "breaking the ice in class" was symbolic as it showed that students were aware of the need to interact for meaningful sense making. Group played a crucial in the learning process - they became more organized and task oriented as demonstrated by the way they categorized their joint findings in a systematic manner. They developed their own contents with the understanding that there weren't much guidelines provided. The contents were thus generated through some degree of negotiation and agreement among themselves. Apparently, there was a sense of confidence in the working as they perceived their "observation" as real.
Although this is an individual assignment, I feel it is some sort of group work as well because I need to work and discuss with my friends for some understanding before I get on the work.	individual work with group effort		

Appendix 18 (continue):

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
There is much information and we have to agree and justify why we think our observation is real.	Active learning involving Cognitive skills	Deep learning	Evidence of course design that emphasized on sharing and disseminating findings. The task design supported collaborative construction of knowledge through social negotiation, not competition. Jonassen (1994)- knowledge construction may best be facilitated by constructivist learning environments
There isn't much guideline as to who is right or wrong. We based on our understanding to create a list of what we think reflect the people life and work experiences.	Understand and create	Co-creation of experiences	In social learning, people perspectives of living and working are often equivocal. A decrease in teacher-regulation leads to an increase in student self-regulation. After interacting with the more knowledgeable others, learner took over her own learning in joint activity.
This is an individual work but I have to share and at the same time asked my friends to share their learning with me.	Knowledge sharing	Ethical sharing and learning	Better time allocation and the willingness of sharing enhanced mutual learning and better judgment of work.
Asking over our group line really helps us to do and organize my work.	Knowledge distribution	success factor in collaborative learning (Johnson and Johnson, 1994) Page 50	Technology provides a shared conversational learning space, which can be used not only for single learner but for group of learners. Promoting interaction by asking questions in Line applications. Individual accountability was mentioned by the student that it is "an individual work". The group processing came with K sharing & positive interdependency of each other contribution. Students seemingly were more receptive as they were keen to ask Qns on the communication apps.
I am able to select what I want to make sure that I have a good combination of countries to give me the most impression.	Select/ combine	Student autonomy / Metacognition : The concept of monitoring and control/ Co-regulation in mCSCL	The new learning process provided higher level of flexibility as student selected and combined the work for "the most impression". The flexibility in learning also gave student greater control over her learning. The learning selection also reflected the metacognitive element in the K acquisition process. These factors enhance the sense of ownership in the work completed.

Appendix 18 (continue):

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
In group work sometimes, we don't even read all what our friends written. We can't control our learning. We can't even select who and what we want for our work. We just accept and hope for the best.	Group work lacks control		Students were able to make evaluation in terms of differences and similarities between traditional and ML teaching. They lamented that there were insufficient incentives, information, skills, and responsibility.
The interaction on our group line also allows me to know who does what and who approached who for information.	Interact for information		Effective learning occurs in the shared conversation space when people can converse with each other, interrogating & sharing their descriptions of the world. The interaction not only fostered collaboration in learning but also motivated student to perform better (much involved and had more access to info). Satisfaction in learning- There was contentment in the learning outcome. P1 was less grade oriented & more towards her ability to "put everything together well". Instead of the teacher setting the grading criteria, student pinpointed what measurement should be used to assess her work.
If we get the grade, it may be good or it may not be. This grade in this assignment is my effort to put everything together well. I am happy to finish this report.	Grades represent effort to organize work	Learning performance	Assessment of Learning: Student pinpointed to an important factor - grading criteria. She suggested that the grading should be based on the effort student placed in "putting everything together well". The feedback was significant for instructors in assessment policy. Evaluation and Feedback: The mCSCL tasks activated students and inspire them to contribute and that itself was seen as a reward as they became an important part in the learning process. Student expressed happiness to have the task completed.

Appendix 18 (continue):

Transcript of P1	1st cycle coding	2nd cycle coding	Researcher's reflection
There is better selection of work, I think it is a good way of learning. But, I just wander how my teacher will grade us.	Grading		Assessment as Learning Evaluation and Feedback The need to have new criteria for assessing performance. Students see the need to elucidate specific assessment that determine her performance.
My teacher also provided some good advises. As she got the information on who did what, she inform me what my other friends have done and I can approach some for help.	Teacher gives advises	Facilitating role of teacher	Student became more responsibility for her own learning and the teacher focused on the problem-solving and building critical skills of the students in the class. There was better educational collaboration that was more satisfying for students and teachers. Student envisaged that technology was used in a new ways to aid learning and this changed the role of teacher and the effectiveness of facilitation. Like a information caretaker, teacher interacted and identified what was needed and how the need could be attended to with the access of information. In other words, teacher customized solutions based on knowledge needs. Data could be an educator's friend in this regard.

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Appendix 19: Transcript of Participant 2 (P2)

Transcript of P2	1st cycle coding	2nd cycle coding	Researcher's reflection
have limited exposure to other Asean country.	Limited exposure	Knowledge of topic/ knowledge gap	Personal knowledge vs Social knowledge
Actually, I have no idea what it is like living in these Asean countries.			
To overcome my low level of understanding in this area	Low level of understanding		
My impression or my imagination of Asean comes mainly from my reading and viewing based on the social media.	Prior knowledge		
Now I see ASEAN as a big community and there is live and work diversity.	New understanding		New Knowledge: Now I see Asean as a big community and there is live and work diversity (making new judgement based on understanding via interaction/ not just taking judgement. Student engaged in deep learning.)
My personal experience living in Thailand tells me that it really takes time to adapt and adjust to this society.	Personal experience		Individual knowledge and social knowledge
In this project, my task is to discover how people work and live in Asean	Discover	Awareness of task	
This class project actually allows me to 'step-out' of my physical restriction and 'step-in' to the virtual space to understand someone far from me.	Step-out of classroom	Learning boundary	Using metaphor of 'step-out' and 'step-in' to associate with the boundary mechanism in learning space.
Using my mobile, I 'wave and chat' to individuals who can share their experiences with me.	Wave and Chat	Connecting people to learning	The task encouraged students to participate spontaneously and independently in learning outside of the classroom. P2 understood the task & was aware that his mobile would be used as the learning tool to "wave and chat". P2 showed certain degree of confidence in the way he delivered his task

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Appendix 19 (continue):

Transcript of P2	1st cycle coding	2nd cycle coding	Researcher's reflection
This is a new form of learning to me as most of my coursework are done without having to contact people or in real situation.	new and Real situation	New Learning technique Self-regulation/ Metacognitive experience	
This learning with mobile is really exciting because I have no idea but to expect and how I would respond.	Exciting learning		P2 perceived the learning technique as new & exciting- in contact with the real practices. There was a sense of uncertainty but it was not a difficult task upon him. Perhaps it was due to the familiarity of using mobiles in communication. P2 had personal network & a social contact list which he had assess to. The SRL provoked the student to plan & get into action for his project.
The excitement increases my wish to explore beyond what I know.	Explore beyond	Proactive learning	As interaction intensified, student became excited & explored "beyond" what he knew.
I begin to trace back some of my friends whom I have not spoken for a long time.	Trace back	Control element in Metacognition/ Connecting people to learning	There were opportunities to be reconnected with former friends whom he had not spoken 'for a long time'. It was a time for re-bonding as student proceeded with the assignment.
However, when considering Asean as a region with not just Chinese but Malay, Indians and other ethnic groups, living in this part of the world become complicated.	Complicated	Metacognitive experiences/ Complexity of topic	Student made judgement of learning &acknowledged that the topic was 'complicated' when taking into consideration various aspects. This metacognitive strategies signified deeper level of thinking.
" Really, Include weekend? How many days do you need to work per week?"	New question	Spontaneity in learning	P2 showed pro-activeness in learning posing questions as the conversation went. Student demonstrated ability to paraphrase to obtain info for better understanding.
And 'ME' stand for my friend "Joy". It is my finding in my interview and activity.	Stand for My finding	Participation in collaborative learning/ Student generated content	Student was able to control his learning & developed a sense of ownership in work done.

Appendix 20: Transcript of Participant 3 (P3)

Transcript of P3	1st cycle coding	2nd cycle coding	Researcher's reflection
My conversation with them were over the FB massager, WeChat and Line App.	Use of mobile apps for communication	Mobile interaction	Personal knowledge vs Social knowledge This student demonstrated some degree of understanding of the topic and had some experiences in this area. She was able to reflect on her own experiences and was quite confidence to interact with people to enhance her understanding. The learning was personal (making comparison with her own country and the in Asean) as well as for the course.
I have travelled to Malaysia and I am now studying in Thailand. However, I have no idea what it is like living in the other ASEAN countries.	Possess certain level of prior knowledge Travel and learning in Asia	Prior Knowledge	
Since I studying in Thailand 3 years already, I saw out that the lifestyle and working of Thai people are most different with China.	Able to see differences between Asean lifestyle and that of China		
My impression or my imagination of Asean comes actually from my reading and viewing based on the social media.	knowledge based on reading and watching online		
So, this class project actually allows me to cross the physical and space boundary to understand someone from Asean countries.	Task and tool facilitate ML.	Crossing of boundary for learning	
In this project, my task is to discover how people work and live in Asean, is this different or similar with my country. I have to chat to people that who can share their experiences with me.	Understood task. Engage in social learning	Awareness of task	
Before, I go into interaction, I would like to discuss more information about Asean based on my learning in class and information that available to me from social media.	Presenting In-class learning material. Search from internet	Pro-active in task by retrieving In-class and online search for learning materials	Access of Online Repository P3 had some knowledge of Asean & was able to effectively & efficiently regulate her learning. She SR her learning by 1st presenting the known element (that was what learnt in class and information from the social media). She further enhanced her learning ('really understand') by approaching her classmates for the sharing &transfer of K.Creating & sharing K required reflection on the learning & an opportunity to work with others in the process

Appendix 20 (continue):

Transcript of P3	1st cycle coding	2nd cycle coding	Researcher's reflection
If I want to really understand the Asean way of living and working, I needed to collect more information from different countries in Asia. So, I decided to approach my classmate David, and we use QQ app to exchange information.	Approach friends for information sharing	Mobile collaborative learning/ peer learning using social apps	
From these interviews, I try to identify the similarities and differences and generate my new ideas about what it is like living in Asia.	Identifying similarities and differences to generate new ideas	Way to generate new knowledge	Based on the information generated from the interaction, the student analyzed the content and created 'new ideas'. Student was able to engage in deeper learning as she was able to make comparisons.
From this class project, my general impression of Asean based on this information have changed my earlier perception of Asean.	Pinpoint a change in perception. New perspective emerged through conversation	Evidence of the development of new perspective with social learning	Emerging learning fostered new understanding and perception. Knowledge continued to be integrated and externalized thorough conversations. Participants' deep interest also gained clarity and became focused in learning.
Now, I realized that just through books and network is not enough to really understand the Asian countries (living and work). So, through the people who from the Asean country to understand their really lifestyle is necessary.	Self-realization of limitation in learning through explicit information. Acknowledge the people element in the sharing of experiences	Social learning involving people enriches really understanding and perceived as necessary	Personal knowledge vs Social knowledge. The socializing context embeds the everyday learning situation and learning informally (Fronhberg et al., 2009,p.8). Significantly, it highlights learning not only comes from just researching for information but understanding from different angles, perspectives and contexts.

Appendix 20 (continue):

Transcript of P3	1st cycle coding	2nd cycle coding	Researcher's reflection
We can have learned a lot of things and we can also make many friends.	Making friends in the process of interacting	Develop learning friendship	Through conversation, student went through a learning process of experiencing, reflecting, conceptualizing, and acting to create new experiences. Socializing context - wider scope that included sharing of learning and strengthening of the interpersonal relationship. Unlike the formal classroom context, the socializing context placed emphasis on the community of learners acting as mutual peer coaches to exchange and reflect on their everyday situations for learning purpose. --support evidence for the appropriate selection of context for ML environment. (P.38)
I think social media is very convenient and useful for us, it can reduce a lot of trouble.	Ease of using social media and applications. Less troublesome	Advantage of ML	Via conversation, ease of learning took place.
It is very interesting and meaningful for me and it deepened my interest to know more about Asian countries.	Deepen interest in learning	Enthusiasm n learning	Social learning generated greater interest as student discovered the unknown.

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Appendix 21: Transcript of Participant 4 (P4)

Transcript of P4	1st cycle coding	2nd cycle coding	Researcher's reflection
I have limited contact with Asean countries except Thailand. I don't know what it's like to live in these countries.	Lack of knowledge	Knowledge gap	Student expressed apprehension over the task and how she could grasp the learning.
This kind of project actually allows me to understand a person far from me across the physical & spatial boundaries.	Learning across boundaries	Boundary across / Learning boundary	Student aware that the task demanded her to interact with people not unknown to her or have no contact before.
Before that, I'd like to talk about my study in-class and social media.	In-class and online learning	Social learning	Wave and chat signified real time conversation. Students could express themselves in more ways to encourage interaction. The friendly gesture created the opportunity for students to become connected with people (near and far) to assist them in the learning.
I have to 'wave and chat' to people who can share their experiences with me.	Interact and share experiences	Ethical sharing and learning: New learning norm- scouting in learning	The shared conversation space provided in group Line helps to construct common understanding & knowledge. Student monitored progress of group through their interactive activities posted on Line apps and strategized to incorporate others' learning into her work in order to meet the requirement of the assignment. Regulation of learning was witnessed in this case.
From the group line, my friends posted some interesting interviews and I ask their permission to use the information	Ask permission to share learning	Ethical sharing and learning: New learning norm- scouting in learning	When sharing became mutual, student illustrated higher level of responsibility and readiness to transfer information digitally. The show of respect for each other work when permission was needed for sharing to take place.
When sharing, I have to ask for friends. This is not really like group work that I am used to.	Have to ask		
When I have to ask for my friend to share their learning, I am also prepared to share mine as well.	I am prepared to share mine		
With their approval, I decided to examine 3 interesting interactions.	select interesting interactions	Student autonomy	

Appendix 21 (continue):

Transcript of P4	1st cycle coding	2nd cycle coding	Researcher's reflection
From these interviews, I try to identify the similarities and differences and generate my new ideas about what it is like living in Asia.	identify and generate new ideas	Deep learning involving cognitive skills	Student formed new perspective and showed ability to comprehend different elements in society towards a more coherent understanding of people and society.The kind of discourse supported deeper learning.
Different countries have different culture and different religion beliefs and they are difficult to integrate into another culture.	Rationalization		
From the interviews, I have also realized that there is also a difference in the standard of life among the people in different countries of Asean.	Interaction shed new understanding	New knowledge	Student developed new perspective based on the interaction. The interaction provided essential information and based on these information, student saw some behavioral patterns which she utilized to make evaluation.
On using my mobile to help me to learn, I think it opens up the classroom space.	Openness in classroom space	Learning boundary	Opened up the classroom space referred to the expansion of the learning boundary.
I can talk and text with people with my mobile applications. I don't need to pay using this method.	technology at little cost	Benefits of ML	Benefits of using mobiles in learning
When I received the information, I have to read carefully so I can write a report that have my opinions. I have to write this report based on my understanding.	Participation in learning	Deep learning involving cognitive skills	Dimension to analyze co-regulation- adapting metacognition (Making adaption to goals, plan or strategies). Paying attention to information received and incorporate personal input to co-create new understanding.
I try to select work that I lack and I think I have a say in that. We have a greater sense of responsibility in my total work.	Greater sense of responsibility	Sense of responsibility	Student made plans to reach the task goal. Regulation in learning was developed with student assuming greater responsibility in the task. Student became task oriented looking into the learning gap and made decision to overcome the shortfalls. Jennex (2005) defines KM as the process of selectively applying K from previous experiences to current and future decision making activities with the explicit purpose of improving effectiveness in learning

Appendix 21 (continue):

Transcript of P4	1st cycle coding	2nd cycle coding	Researcher's reflection
Actually, I think this is a fun way of learning. I don't have much pressure but I need to learn with understanding.	Less pressure	Enthusiasm in learning	Changing the mind frame of the student towards learning is a important impact of ML. Student enjoyed the pressure-free learning technique which allowed deeper 'understanding'.
The further search on the internet was useful with facts.	Further information search	Participation in learning	Access of Online Repository Enacting strategy: New ideas or concepts surfaced from the interaction drove students to focus onto the point of interest. This was a significant step taken by the student as it demonstrated involvement and commitment to learning and understanding.
I think I am lucky to get to chat with very friendly people in the project. My participants were patient to answer my list of questions.	Willingness to participate	Develop learning friendship	Participant openness and positive reaction to the interaction was crucial to the completion of the task.
When a participant saw that the list was long, they asked me to send to their mailbox so that they can print out for me. I realized he was willing to do more to help me.	Participation in learning		Efforts shown by participant made the learning practical & meaningful especially when participants exercised co-regulated learning behaviors – It's no longer a simple conversation but a commonly shared concern towards learning prevailed. Foster co-regulation
Technology has make my learning more productive and I am confident to talk about my work.	Productive learning	Effective ML	With the integration of mobile technology, productivity in learning increased as student became 'confident' in discussing about her work.
My instructor who provided the guidance as to how the report can be improved.	Provide guidance	Facilitating role of teacher	Learning became personalized, instructor's guidance shifted towards student-centered as in this case the suggestion for improvement was made based on the information presented by the student. Mobile devices in school furthermore helped students to "leverage the device's capabilities to increase personalization of learning process".

Appendix 22: Transcript of Participant 5 (P5)

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
In this project, my task is to discover how people work and live in Asean	Purpose of assignment	Awareness of task	Student appraised her learning activity as interesting. Removing the stressfulness in learning, brought her a sense of competence and increased capacity to learn.
I realized that my friends are most willing to help because the objective of the task is that we all have a good understanding.	Meet the objective of the task		
When my teacher requested the class to interview people in Asean to understand how they work and live in this region, I thought it was an interesting method to gather information.	Interesting learning method	Social Learning	
I don't feel the stress of the learning.	little stress		Statement indicated low pressure adopting ML. Perhaps the activity did not generate a heavy workload.
The interaction has an influence on our learning strategy.	Influence of interaction on learning		Evidence: Student was quite positive about the ways she thought the use of mobile devices would transform their learning environment citing that 'the interaction has an influence on our learning strategy'.
However, I wasn't sure how much information would they share with me especially they didn't know me to talk something personal.	Uncertain of the outcome	Apprehension of the learning method	Student was receptive to the use of mobile in learning and understood the mechanism of social learning but was apprehensive in terms of K dissemination from the external sources. The fact that she was not sure of how much information would be shared and the depth of the information.
My earlier understanding was mainly from the news and postings on the social media. Being with some of my Asean friends from my university also let me experience the way they think, act and behave.	Understanding based on reading and being with Asean friends	Prior Knowledge	Social learning is embedded on the school Social system as students are exposed to the increasing number of international students in the university.The daily encounters enable student to acquaint with foreign lifestyles, manners and behaviors.

Appendix 22 (continue):

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
There are two other ways I learned outside my classroom learning time. My teacher arranged us to visit the Asean Cultural Center ……With this project, I have to use my mobile to conduct interviews.	out-of-learning - educational trip and ML	Alternative learning methods	Learning time was not confined to the periods in class. There were more alternatives to learning outside the physical space of the classroom.
I read the messages and what my friends discussed among themselves and with the instructor formally and informally (our own Line group among the Chinese students in class).	Read messages on group Line apps	Formal and informal communication	Students recognized the online messaging as collaborative learning. The posting of messages was an important source of information in the knowledge dissimilation process. These messages contained essential knowledge and helped in the formation of strategies for the task. Student found these links useful as evidenced by her comments. Significantly the student perceived the online "close" learning community effective in formation of a common knowledge pool based on the social interactions.
I realized that the mobile apps are rather useful and it cost me nothing but I just need to try to communicate the best when I text and talk to them.	Ensure good communicate	Responsibility in learning	Benefits of using mobiles in learning
I thought this was a good guide at least I became what you expected to ask and write. There is a standard I need to follow.	Follow standard	Learning standard	In the Adaption phrase of the SRL, student upon receiving the information, started the evaluation with monitoring and adapt the learning by standards set by the classmates.
In the short time given to complete the work, the guided questions were useful.	Short time to complete work	Time management	

Appendix 22 (continue):

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
As I continue with my search online, I also found that aging is a surfacing problem in some of the Asean countries such as Singapore and Thailand. I found a very interesting statistic on Asean aging population trend. I looked into the details of the population.....	Further information search	Proactive learning/ emerging activity	Access of Online Repository Self-regulated learning (drive-in) Co-regulated learning ------Self-Regulated learning (Enhanced/ Directed/ dive-in effect to learning) Student engaged in deeper learning with the search engine. Student committed to create new understanding and knowledge of the topic of interest. The student is able, ready and willing to prepare, execute, and complete learning independently
I see this mobile phone interview from different countries a good activity. It also give me the opportunity to know people better and I think I will continue to communicate with these people I made online, I hope I can understand their country more deeply in the future.	Continue to communicate		Student was enthusiastic about her experience of the online interaction and felt that the medium was appropriate for the task. The student saw advantage of the networking and expressed desire to continue the interaction in the future.
I found that from the chatting, my interviewees said something interesting and I could just use the concept that they introduced to me and connect to the internet for more information and the knowledge gained expanded.	Knowledge gain from internet search	Leveraging knowledge using mobile in learning	Access of Online Repository Students recognized the online forum was about collaborative learning, as evidenced by these comments. The learning process was student-centric as shown in the student's remark that she would further explore new concepts introduced by the interviewees. The online search facilitated the intensity and creativity of the learning. Student pursued her personal interests on a new topic and she connect to the internet for more information and ultimately led to substantial knowledge creation which she referred to as 'knowledge gained expanded'.

Appendix 22 (continue):

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
To make sure that I do better with more help, I approached my teacher and ask for assistance as to how I could improve my work and my teacher suggested me to put pictures to help the reader to understand what I wished to present and share.	Teacher suggested placing pictures to improve work	Facilitating role of teacher	Assessment as Learning: This is part of a cycle of assessment. Students and teachers set learning goals, shared success criteria, and evaluated learning through dialogue and self and peer assessment. Assessment for Learning: Assessment focuses on the gap between the current knowledge of the learner and the desired goal of the learning. Feedback is key to this form of assessment in order to provide information to the learner to support the learning process. These 2 forms of assessment occurs simultaneously. This demonstrated collaboration between teacher and students. Teacher guiding each student to approach the learning activity in a strategic way. Teacher helped student to monitor individual progress, construct meaning from the content learned and from the process of learning it, and applied the learnings to other contexts and settings. Learning became an ongoing process engaging the transformation of thinking. Feedback supported the development of learner SRL. Self-regulation was facilitated by the active construction of knowledge through group interaction, peer feedback, and discussion. Motivation and belief were required for self-regulation as learners needed to know that their efforts would produce results.
I asked my teacher who have a good chat interview and my teacher recommended me some.	Asked teacher to help		
Before using their findings, I first asked their permission if I could use their work to help me understand the context better.	First ask permission to use	Ethical sharing and learning: New learning norm- scouting in learning	Evidence of awareness towards the ownership of work is vivid in this statement. The sources of the shared materials were indicated and the approval of the learning partner was given before student adopt and adapt the learning.

Appendix 22 (continue):

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
It is not considerate to talk too long over the phone so, I think if I am able to use the keywords or new ideas, I can further search the internet for more information.	Not nice to talk too long		Access of Online Repository Student demonstrated good online interview etiquette. Understanding the restrain and limitations of online interaction, P5 was able to strategize & self-regulating her learning. She identified keywords and conducted online search based on the information provided. Being considerate in the interviewing time also reflected student's self-efficacy and exercising interpersonal skills in learning across boundary.
To find my participants…unlike my friends, I didn't look far.	Proximity as a selection criteria	Learning strategy	
To overcome the shortcoming of my work, I am happy that my teacher encouraged everyone to share our learning.	Knowledge sharing	Collaborative learning	Evidence of task analysis in SRL: Learner developed a work plan and generated a view of what the task was about and the limitations it faces as well as the resources needed for the task purpose. Teacher thought: Knowledge management is regarded as an important part of developing ML, finding a way to successfully transform ordinary ML to knowledge-based learning would be necessary in order to enhance learning effectiveness and to share the knowledge with others.
Then I realized that my friends are most willing to help because the objective of the task is that we all have a good understanding by the first talking (socialization) and then sourcing out who have what and where and who can share and learn.	Source out who, what and where can share and learn.		Evidence that student exercised interdependency in learning (co-regulated learning). Student was empowered to be more independent and interdependent. She took greater control of her learning by participating in the planning as in the sourcing and sharing process of the learning.
Through peer learning, I have also realized the following aspects - "Open-minded and try something new".	Open-minded and learn something new		New mindset in ML environment - Open-minded and try something new

Appendix 22 (continue):

Transcript of P5	1st cycle coding	2nd cycle coding	Researcher's reflection
My performance will be based on my understanding and how well I cooperate with my friends to make my learning meaningful.	Seek meaningful learning instead of grade oriented	Learning performance	Evaluation and feedback: student self-assessment
For a while, my focus was not the grade. But to meet the target of 3 people and after to talking one, I realized it was not difficult and the next two went well.	Not so much on grade but on the interaction		Evaluation and Feedback Student became task oriented and became involved in the learning process and in the completion of the task, rather than on the scoring as the standard of performance.
I can say, after this exercise, I have a deeper impression of Asean. The interaction and the self-learning (Finding keyword, search information and linking information together).	Finding keyword, search information and linking information together	Deep learning involving cognitive skills	Access of Online Repository Students with opportunities for self-directed practice could help to improve their self-regulation (Jossberger et al, 2010). In a self-directed learning environment, students had more freedom to generate and pursue their own goals, and undertake critical evaluation of the materials they select. The self-directed learner initiated the learning task, whereas in self-regulated learning, the task could be set by the teacher (Robertson, 2011). Student thought about her learning and the internet enabled the search for information for new knowledge. The task was easily supported by technology.

Appendix 23: Transcript of Participant 6 (P6)

Transcript of P6	1st cycle coding	2nd cycle coding	Researcher's reflection
I have no idea what it is like living in these countries. My impression or my imagination of Asean comes mainly from reading and viewing based on social media.	Little impression	Prior knowledge	Limited understanding on the topic
This class project actually allows me to overcome the geographical barriers to understand someone far from me.	Overcome geographical barriers	Boundary crossing/ learning boundary	Mobile as a learning enabling tool. Shift of focus from teaching to learning
In this project, my task is to discover how people work and live in Asean	Purpose of assignment	Awareness of task	Active involvement in the learning and set strategies to attain the learning objectives
I set three areas where I want the information. The questions that aims to find out.	Set criteria and questions	Communication and learning strategy	
I have to "wave and hello" to individual who are willing to share their experiences with me.	Knowledge sharing	Social learning	The assignment was clearly delivered to the student. He was also aware of the purpose of the task that is "encourage to socialize with people to obtain the information'. This also illustrated the shift from a teacher-centered to a learning-centered innovative approach, integrating mobile tools and learning in the course.
To complete this assignment, we have to really understand the way people live and work in this region. So, it may not be enough just to have facts and figures. Therefore, we are encouraged to socialize with people to obtain the information.	Openness/ Encouraged to socialize to obtain information		
In this course, we visited the Asean Cultural center and we are able to get a list of contacts provided by the coordinator of the center.	External educational trip	Network and communities	Student anticipated that going into foreign territories needed more than just search but to interact with people who possessed the experiences. By expanding the learning boundary, student obtained some contacts for direct interaction. Student moved from a community of learning to wider networks. Referencing was also an important factor in cross boundary learning.

Appendix 23 (continue):

Transcript of P6	1st cycle coding	2nd cycle coding	Researcher's reflection
Mr. Artino whom we met at the center, shared a list of his friends to us and I took this opportunity to work on my project.	Shared a list of friends		External information provider (signified a wider classroom context)
to make direct contact with the right person at the right place for the right purpose.	Right people, place and purpose		
My interview with Casey is not instantaneous conversation. I posted the questions developed in class to Casey & she took time to look at the questions and replied me.	Took time to reply	Time management	There was the flexibility of time in responding to question posted.
I think this is good because the participant of my interview does not need to rush to answer my questions.	Don't need to rush		Student believed that if interviewee took time to think and answer the questions, the answers would be more comprehensive.
From the group line, my friends posted some interesting interviews and I asked their permission to use the information	Permission to use information	Ethical sharing and learning: New learning norm-scouting in learning	Student kept an eye on the messages posted and approached the classmates for permission to incorporate their works into hers. Student engaged in active search - identified her own learning gap and located the knowledge that was needed to complete the task.
With Casey interview note, I decided to explore more about Indonesia.	Further information search	Proactive learning/ emerging activity	Access of Online Repository Drive and dive impacts on learning: SRL (drive-in) ------- Co-regulated learning ------SRL: (Enhanced/ Directed/ dive-in effect to learning) Student engaged in deeper learning with the search engine. Student committed to create new understanding and knowledge of the topic of interest. The student was able, ready and willing to prepare, execute, and complete learning independently.
My general impression of Asean based on this information have changed my earlier perception of Asean.	Perception changed	New knowledge	
This is an interesting learning method.	Interesting learning method	ML	Student reaction to M: Interesting

Appendix 23 (continue):

Transcript of P6	1st cycle coding	2nd cycle coding	Researcher's reflection
The key point to this learning is to increase our understanding. It is like looking and generating an understanding based on their living environment and the situation they are in.	Real situation and environment	Authenticity of learning	Evidence that social learning has an impact in knowledge construction
… the cost is practically nothing, the learning is real and meaningful.	Real and meaningful learning		Benefits of using mobile for learning purposes
From this exercise, we take better responsibility of our work and we make better decision as to how we can improve our work.	Responsibility at work/ make better decision	Deep learning involving cognitive skills	Student took responsibility in the learning. Making better decision to increase the quality of the work. Student demonstrated ability to assimilate and organize knowledge.
The weekly feedback and discussion with my instructor is productive as I began to make changes and approach my classmate for good input to the report.	Feedback and discussion	Facilitating role of teacher	Evaluation and Feedback / assimilate and organize knowledge. This showed the evidence of collaboration between teachers and students. Instructors often played the role of facilitators, to make sure that the discussions were relevant to the task. The collaborate with other learners, teachers, experts, increased the learning experiences (good input to the report).
I appreciate my friend's work. I am happy to share my work as well.	Show appreciation	Ethical sharing and learning: New learning norm- scouting in learning	Knowledge diversity: sharing of work and learning Sense of happiness and appreciation of peer sharing in learning. Sharing experiences also came a sense of pride

Appendix 23 (continue):

Transcript of P6	1st cycle coding	2nd cycle coding	Researcher's reflection
It is not just sharing but we try to integrate our work with understanding.	Integrating our work	Collaborative learning	Evidence of how student exercising reflective learning: When students reflected on the teaching and learning process, they are strengthening their own capacity to learn. Central to this is the principal of reflection as metacognition, where students are aware of and could describe their thinking in a way that allowed them to "close the gap" between what they knew and what they needed to learn. Evidence of Products out of operation - Student had positive expectation of the outcome. Peer discussion and collaboration support pedagogical change and growth ('outcome').
I see myself better organized and eager to see the outcome of my report.	Improve learning skill	Learning performance	
I hope my instructor see my effort to create the work and more, enjoy the reading and understand that my work is reflective of the real world we live in.	criteria to assess	Learning outcome	Evaluation and Feedback Participation and active learning process seen as essential factor in assessing performance. Ownership of learning Student acknowledged the joint learning effort of the everyone involved and referred the finished work as "a good piece of shared work". She also used the word 'produce' to indicate that the work is student-generated and therefore took ownership of the learning.
I know it is not the grade that matter but being actively involved in every step of the task and making sure the work is meaningful drive me to improve and produce a good piece of shared work.	Actively involved in task	Participation in learning	

Appendix 24: Transcript of Participant 7 (P7)

Transcript of P7	1st cycle coding	2nd cycle coding	Researcher's reflection
Through interviews, I learned a lot about ASEAN, learned more about the political and cultural differences among the ASEAN countries.	Learned a lot from the interviews.	Social learning	Co-regulated learning and collaborative work require students to build and maintain positive relationships with their partners in order to successfully communicate with each other. This was what Su has failed to achieve with his high absence rate. Failure to communicate with partners could lead to a negative relationship between dyad members that diminished the potential and perceived value of co-regulated learning. Because of his inactiveness and inattentive behaviors in class, Su's work was not shared or requested.

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Appendix 25: Transcript of Participant 8 (P8)

Transcript of P8	1st cycle coding	2nd cycle coding	Researcher's reflection
Personally, I have not travel to many of these countries and it is not possible …..	Limited knowledge	Prior knowledge	Reflected shallow knowledge on the topic
Although from social media and social channels, I am able to visualize and image what Asean is like but my understanding is limited	knowledge from social media		
To increase my insight to the understanding of Asean, I started to discuss our interaction with each other.	Discuss interactions increases insight	Collaborative learning	Social learning enables greater insights into learning that might not be easily understood or covered by text or lecture materials.
My friends shared her information with me…….. Learning I acquire from my friends who add-on to my understanding	Knowledge sharing	Peer learning	Co-regulated learning: students co-ordinated and shared their learning as an enacting strategy to do the task
From the interaction with my Asean friends, I have realized that the societies they lived in are actually very different.	Interaction enhances understanding	Social learning	Identified knowledge gap and narrowed through social learning via interaction and sharing of personal knowledge.
Although I have talked and learned from 5 participants in this project, my understanding of Asean has improved substantially.	Understanding of the topic improved		Evidence: The cooperation between the two parties would become more mutual with the out-of-school boundary-partners eventually taking a greater role in the collaboration efforts. Working together in the shared regulated learning process, student meet the refinement of cognitive, motivational and emotional conditions as needed to derived at a shared outcome (Allyson Fiona Hadwin et al., 2011; Panadero & Järvelä, 2015).
If not for the interaction with these people in these countries, it would not be possible get the insight of how people live and work.	Mobile enables the socialization for learning		
Learning with my mobile has enabled me to interact easily.	Mobile enables easily learning	Benefits of ML	
I didn't expect I would be able to obtain this information. But I am amazed of the effectiveness of the learning tool - my smartphone. I see the benefits of this learning	Effective learning with mobile		

Appendix 25 (continue):

Transcript of P8	1st cycle coding	2nd cycle coding	Researcher's reflection
The talking allows me to ask more questions.	Asking questions	Proactive learning/ emerging activity	
Some of the information are not available in text or classroom learning materials.	classroom learning does not provide all information	Learning boundary	Co-ordination on exchanges and transition across boundaries. Co-ordination arises when student and their external learning partner find effective ways to enable cooperation
In a short time period, my mobile applications let me talk to people at no cost in 3 countries.	Mobile enables task done in less time	Time management	Benefits of using mobile in learning
The mutual sharing of learning in class also gave us the chance to talk to each other and we could select what we need to complete the assignment.	We could select	Student autonomy	Knowledge diversity Socially shared regulated learning: The class made effort together to discuss and share information. They planned how they could effectively collaborate ideas from each other to complete common task.
I also realized that when I talk to my interviewee, I was also listening much carefully.	Listen carefully	Engagement in learning	When boundary-crossing learning becomes a way of learning and practice, students will acquire the skills to interact in cross-boundary learning context. Student developed listening skill.
When I gathered all the information, I began to create my own impression of the Asean experiences which my lecturer would like us to learn.	Gather information to create impression	Co-creation of idea	Assimilate and organize knowledge See the significant of social learning and understood the intention of the learning.
This is a very interactive learning method which I not only enjoyed doing but also interacting with my classmate and sharing information using our Line applications	interactive learning method	New Learning technique	With ML, learning shifted to become more community-based and interactive.

Appendix 26: Transcript of Participant 9 (P9)

Transcript of P9	1st cycle coding	2nd cycle coding	Researcher's reflection
Talking with the people in these countries is a good way to learn about they live and work.	Talking	Social interaction	Evidence supported the learning impacts in social learning especially topic concern implicit knowledge such as one's experiences.
This assignment tries to meet the objective of deeper understanding and creating better impression based on interacting with people in those countries.	Meet the objective	Awareness of task	Awareness of task and purpose
But if you can make careful decision to whom you can ask for help, it will help you to score well.	Make careful decision	Learning strategy	Assessment and performance criteria - decision making process
We brainstorm what we needed to find out.	Brainstorming	Collaborative learning	Student looked beyond the technical aspects of using technology for learning. Seeing it as an enabling learning tool, student felt that ML is an effective pedagogical approach if the activity engaged student to develop learning plans, making decisions as to how the learning should be conducted, brainstorm for effective solutions and guidelines and to work collectively together. The contribution by group was mentioned and given priority which indicated that each individual was expected to perform the task appropriately to provide the support and sharing requirement in the task. There was also a sense of division of work though not specifically mentioned (students have the choice to select and integrate the work of others). These criteria at work implied high involvement of the individual and the expectation to perform well is also a shared understanding because of the collective nature of social learning.
It is a good way to learn and learning is both collective and individual	Collective and individual learning		ML is perceived as a good collective and individual learning method
We still get the benefit of the work by others & they too can ask you for help	Benefits of work	Mutual learning	Ease of communication & active learning facilitated K sharing for mutual benefits in learning

Appendix 26 (continue):

Transcript of P9	1st cycle coding	2nd cycle coding	Researcher's reflection
This assignment is actually very different from other group works……But this assignment, everyone takes the role of the team leader. We must carry out the task by ourselves.	Role and responsibility	New Learning technique	Student was able to make comparison between ML and traditional learning methods. Student had a different view on the concept of team and leadership in learning which reflected greater responsibility in learning by everyone. (Everyone takes the role of the team leader) The mobile technology-based learning was considered as a new teaching method that student needed to be engaged and perform to learn. It was not a simple and easy task but a task that needed one to take personal responsibility to explore.
I started to discuss with my group and talked about our project over weekends	Out-of-class discussion/ activity	Proactive learning/ emerging activity	Community-based learning in an interactive setting Students became active and interactive learners
After my texting with Jasmine, I decided to do some research on this country.	Online information search		Access of Online Repository From the interaction, student took action to conduct further research on the topic (applying her cognitive ability for her regulated learning. Evidence that ML facilitated self-directed and informal learning (I decided to do some research)
Make sure we meet the deadline and approach the instructor what and how to improve on the work before submission.	Meeting deadline	Time management	Evidence that ML supported blended learning environments
The guide shared his knowledge of Asean and presented the diversity of Asean ….	External learning	knowledge sharing	Learning from the experts of the subject (external source)
I have decided to ask my classmate to share their interaction to build upon my understanding of the Asean sensation.	Internal learning		Evidence that learners' engagement extended within and outside of the classroom.

Appendix 26 (continue):

Transcript of P9	1st cycle coding	2nd cycle coding	Researcher's reflection
I think it is not something you can find in the internet because it is about each and everyone experiences and if we don't ask we simply can't get access of the information.	Unable information online	Access to knowledge	Student became interested in the task was because it was something that she realized could not be searched from the internet. The content of the learning was more complex and deep. It was not perceived as difficult but required cognitive processing with "careful decision' making. The assignment reframed the thinking of the student "if we don't ask we simply can't get access of the information". This was the driving force activating student to think more about the task & how she could proceed & process the information in which she had to present and share. To access to these info, learning across community was needed. This was a good eg. of how boundaries foster interlinkage between formal knowledge in the academy and the informal work process knowledge in the practical world (Akkerman & Bruining, 2016).
As a class we can share with each other's individually. I can have choices. Choice to ask, choice to use and choice to share.	Choice to learning		Student overcame her shyness to ask & fear of being seen as copying when she realized that mutual sharing of info was practiced among the classmates. This changed the learning culture. Technology facilitated normal interactions between the students
I was shy to ask for information as I was afraid that I may be seen as copying others	Shy to ask / copying	Apprehension in learning	Student expressed reservation in asking for fear of being seen as copying/ Student who might not feel confidence using mobiles as a learning tool and interacting in social learning platform
It is just like you try to decorate a boutique of flowers. If we only have one kind of flower than it will not be colorful. But if we can find many types of flowers, the art of arranging the flower will make it lively.	Metaphor 'Boutique of flower'	Social learning	Metaphor of mobile collaborative learning and its greater impacts

Appendix 26 (continue):

Transcript of P9	1st cycle coding	2nd cycle coding	Researcher's reflection
I was not sure if all the questions could be covered but at least it was a guide to show what I should focus on.	Uncertainty		Student made effort in preparation to ask questions. A list of questions was prepared before hand and student felt that it would help her to concentrate. Student developed more concentration in an effort to perform better in the interaction.
I tried to follow the list of questions but there were some changes as the conversation flows.	Changes to questioning	Spontaneity in learning	
The three countries I interviewed is only the little window of a giant house. I needed to open more windows to see light in the house. Having more windows is like replacing the surrounding walls with glass panels and you think you see the house much bigger when looking from outside.	Metaphor 'Light in the house'	Boundary to learning	Assimilate and organize knowledge an act of knowledge creation. Metaphor of knowledge building and innovative learning method
If we only based on the texting, the information may not be enough so, we need to Zoom in and do additional research to add on to our knowledge. But if we start to paste each and more experiences of the people, we can see some form of patterns to make us see the bigger picture.	Metaphor 'Puzzle'	Depth of learning	Access of Online Repository/ Knowledge diversity Evidence showing student select better tactics to accomplish the task. Student identified task cues & work with them to produce quality work. This itself demonstrate the creation of student-generated content. Technology is a pathway promoting the liberalization of students via greater responsibility for their learning, instead of making them more dependent on the provider & technology itself.
For this reason and to make my report solid.	Solid report	Learning performance	setting expectation and standard- SRL behaviors
I am happy because this is my work.	My work	Student generated content	Student generated content. Student felt happy with the work done. The keyword was "MY Work" - the contentment derived from ability to create & compile the report in the best effort.

Appendix 27: Transcript of Participant 10 (P10)

Transcript of P10	1st cycle coding	2nd cycle coding	Researcher's reflection
I have yet the chance to travel to all these countries to experience what living and working life is like in this region.	Yet the chance to travel	Prior knowledge	The context of ML is more than time and space. There can be a variety of learning contexts (boundary crossing/ social learning/ formal and informal / individual or group). Student's remark highlighted the significant opportunity for the student to explore how mobile technology could support learning and contribute to effective teaching instruction.
As a Chinese student studying in Thailand, I have already exposed to the unique lifestyle of the Thai people.	One exposure		
When my instructor gave us the assignment to explore Asean way working and living experiences, I thought how possible it could be because as a student, I was not financially capable to travel to these places. Fortunately, I have my mobile and a list of friends on my social network.	Feasible with mobile and social network	Network and communities	
Tracing my list was not easy. I have to filer (filter) to get the suitable candidates to approach for the interview.	Active search for contacts		Though it was not an easy task, P10 relied on her personal network to accomplish the task in selecting individuals for the interaction.
Participants are able to share the work/ living experiences. They all have the working experiences and they live in different countries in Asean which gives the diversity I needed for this project.	Set criteria to work	Awareness of task	Social learning via mobiles communication applications enhance learning experiences of the student.
I have several lectures about Asean since the start of the semester. These were new learning….bigger picture of Asean.	In-class learning and new knowledge	Learning in class	Combination of classroom learning and social interaction facilitated greater understanding.
This huge gap in income is reflected in my interaction	Knowledge through interaction	Social learning	Interaction affirmed the learning in class.
The talk by the guide from the center gave new learning on the social aspects of Asean.	Out-of-class learning		External expertise and learning source (Face-to-face). New perspective
Learning become more challenging when my class assignment required me to interact on mobile with people in Asean.	Challenging learning task	New Learning technique	Learning was no long shallowly comprehended.

Appendix 27 (continue):

Transcript of P10	1st cycle coding	2nd cycle coding	Researcher's reflection
I thought it was a difficult task because I did not know who to start with especially talking to a stranger.	Perceived as a difficult task		Most students are used to write with their laptops to write, browse the Internet, make presentations, do homework, or take tests. Thus, mobile devices are effective content-delivery tool. But when concerning communication in higher-level tasks, student expressed her worries because of the unfamiliar learning situation. The feeling of insecurity was a result of being leap into an unfamiliar task and territory (especially in cross-boundary learning). Student felt the task demanding as it required one's communication and language skills. The task of having to co-create the content might be seen as a demanding task. Student needed to adapt more in this new mobile social learning context.
I really wasn't sure how the report would be like.	Uncertain of the outcome		
I have no idea if I was able to do that (the interview on mobile).	Express apprehension		
I inform them (participants) of my objective and the interviewees were rather surprised with the task.	Activity is new to participants		In mobile interaction, student was able to make sense of their learning by enhancing his or her identities as learner.
My instructor asked us to think about who do we know in Asean by looking into our Facebook friends.	Teacher prompted questions	Facilitating role of teacher	Personal network and contacts to conduct mobile interviews
A list of recommended people was given to assist us by my lecturer and the Asean Cultural Center guide, Mr. Artino.	Assistance provided	Facilitating role of teacher and external help	External network sources could aid online interaction
Before we started the conversation, the class sat together and develop a list of possible questions that they well lead us to answer we would like to have.	Discussion and conversation in class	ML process	Evidence of active learning and preparation for interaction. The developed list of questions was a group effort to ensure the quality of interaction.
Using this list of questions, we began to have some idea what we need to ask them when I call in.	Asking prepared questions		Student's confidence increased when she was better prepared for interaction in ML environment.

Appendix 27 (continue):

Transcript of P10	1st cycle coding	2nd cycle coding	Researcher's reflection
As we interact, the conversation started to move smoother.	online conversation accelerates		
The next step we did was to share our learning in class.	Share learning in class		Indication that the collaboration of various activity systems could enhance sense making and transform intersecting practices.
We discuss among ourselves based on the countries we explored to find the differences& similarity in the way people work & live. There were much talking in class.	Much talking in class		
We started to find interviews from countries that we didn't cover.	Search for useful information from classmates	Proactive learning/ emerging activity	
We were given three weeks to complete the task. It was not easy because respondents took time to add me in and find time to chat.	Time taking for add-in and time to chat	Time management	Student became time-conscious in the learning process signifying active thinking about how the task could be proceeded and completed. Student took into consideration various affecting factors that might hinder the task and anticipate barriers so as there could be better time management & greater control. This also showed that student made effort to manage and organize work for good outcomes.
It took some time for me to choose the participants and ask them when would they have time to do interview with me, also later I spent time on the interaction with my friends to get more information.	Interact with friends for information		
Very different from our weekly class session. We talked for the first time among ourselves and we try to figure our thinking using the information we gathered.	Figuring out using information gathered	Deep learning involving cognitive skills	The othering process took place and complemented new learning into their domain to allow co-existence (trying to figure out). Statement showed that learning tasks could benefited from a blending of mobile and non mobile devices.
The report is individual work but the working together in class help is to form ideas we needed.	Individual work but working together	Co-create ideas	Evidence of active learning and the regulation of learning (SRL-CRL-SSRL)

Appendix 27 (continue):

Transcript of P10	1st cycle coding	2nd cycle coding	Researcher's reflection
It was very noisy in class but we managed in the end to get answers that we could use for our efforts	Getting answers with our efforts	Collaborative learning	Strong evidence of ML: This project saw mobile technologies aiding in the creation of student-generated contents & enable each to articulate and enhance the K sharing process thereby transforming the classroom into a 'noisy' new learning sphere - a new interactive learning culture emerged. Student actively involved in the K sharing process with collaboration, reflection & articulation. A useful approach to engage student in introductory authentic task. The degree of activeness signified the important understanding of how, what, when & why to use the communication tools in the KM processes.
The interaction among ourselves was useful because we started to notice who did what with who. Some of my friends posted the discussion on our group chat which helped us to store the information for use.	Effective interaction on group chat.	mobile collaborative learning	Mobile phone helps to organize, store, and recall of the information student needed anytime and anywhere. Student recognized the mobile-aided discussion was about collaborative learning, as evidenced by the comment "synergy in learning".
The outcome more interviews and more views gathered. That is what I needed to complete the assignment.	More interaction more information available	Learning outcome	
It is teamwork & individual work all together	Teamwork		Increasing individual responsibility while tapping on group efforts.
The texting and video calls on the mobile were not that long but the interaction with my friends and lecturer in class and on Line or WeChat were more because now I need to put many ideas into the report.	Interaction with friends and teachers essential for completion of report.	Social learning in and out of class	student was able to interact with the teacher to put the ideas into the report. Communicating with the teacher is essential in the learning process.
Rosa shared an article from the internet. From this article, I discovered that Singaporeans were able to own apartment with the saving at work.	Knowledge sharing	Implicit and explicit knowledge	Evidence: Peer learning generated new understanding

Appendix 27 (continue):

Transcript of P10	1st cycle coding	2nd cycle coding	Researcher's reflection
Tian Hui also presented some interesting information and picture of Yangon city	Interesting information and picture	Benefits of ML	Visual aids in learning help to gain attention and stimulate further actions into the learning
During the interviews, my mobile phone and iPad help me a lot, I used WeChat, Messenger and Line to do interviews with these people and also record the interviews by Notes and album.	Multiple functions of mobile		Mobile is an effective learning tool: ▪ functionality of mobile (communication apps and data storage) ▪ availability of channels and applications.
I enjoyed this learning so much because I got the chance to talk with many people, get to know them and their society more.	Enjoyed the interaction	Satisfaction in learning	Enjoy the learning (Focusing on people activities and experiences) - individual and collective contexts of learning
The first motivation for me to interact with my participants is this task from class, and second motivation is I want to know more about my friends and have a deeper relationship with them.	chance to interact and relationship development	Motivation to learning	Student was motivated by the communicate: 1. First because of the task 2. Second to develop friendship with participants.

Appendix 28: Transcript of Participant 11 (P11)

Transcript of P11	1st cycle coding	2nd cycle coding	Researcher's reflection
In my opinion, it was really work for help this project because we didn't have a time to make a long conversation but we can leave the message in the chat box. It was very convenient.	Short messaging an alternative to Face-to-face	Social learning	Mobile technologies have great potential in facilitating more innovative educational methods. Simultaneously, these patterns in educational methods are likely to help subject content learning, and facilitate the development of communication, problem-solving, creativity, and other high-level skills among students (Warschauer, 2007)
They were happy to share their knowledge when we explained the purpose of our mission.	Share with understanding		Sharing of individual learning brings a different set of ideas and perspectives adding on to the diversity in learning.
When I got their information, it has many topics that I was surprise. And it made me want to study a lot about Asean.	Diverse discussion topics		SRL includes the cognitive, metacognitive, behavioral, motivational & emotional/ affective aspects of learning. Motivational & emotional processes occur without student's awareness.
I spend a lot of time with this project to communicate with them bec' we didn't have a lot of free time, so I am interested in waiting for answers from them.	Time needed for reply/ time constraint	Time management	
When I talked to them, I tried to make our conversation look funny, not too serious, but I still had a good sense of humor. And I was happy when I work with them because they cooperate very well.	Trying to create friendly atmosphere Participants willing to assist	Develop learning friendship	Evidence showing student adapting to the situation and trying to create a lively atmosphere to encourage interaction. Through the mediated tools, student established social interactions. The learning behavior was SRL. Student's reflection led to internalization. Internalization is the process where learners take the new info & K gained from a social interaction & later use the necessary skills to apply the info obtained in a different independent learning activity.

Appendix 28 (continue):

Transcript of P11	1st cycle coding	2nd cycle coding	Researcher's reflection
I have got a new thing from my foreign friends. For this project it was helping me to learning about ASEAN.	Received information	New knowledge	Social Learning Theory posits that people learn from one another, via observation, imitation, and modeling.
I am in fact very much surprise of the outcome of the learning activity. I have never thought I could talk to strangers using messaging applications called Hello Talk.	impact of using mobile for learning	Satisfaction in learning	PRODUCT (SRL) Mobile devices have various distinctive features such as individualized interfaces, real-time access to information, context sensitivity, IM & feedback. These features can enhance the effects of certain pedagogies, such as self-directed learning, inquiry learning, or formative assessment. However, features of mobile devices are not sufficient conditions for positive learning effects. The minor effects of mobile-device-based cooperative& game-based learning in the study illustrated this fact. Instructional strategies are important for effective learning with info technology (Lan, 2014; Lan, Sung, Cheng, & Chang, 2015; Liu, Lin, & Paas, 2014). Researchers must find the "key" to integrating mobiles with instructional strategies & ingeniously match the unique features of mobile devices to the resolution of specific pedagogic challenges. Doing so will maximize the impact of those features on learning outcomes.
He is proud to be the manager of Baba and Nyonya Museum. The Baba & Nyonya Museum is located in Melaka, a World UNESCO sites	Further information search	Proactive learning/ emerging activity	Access of Online Repository
Although there were 21 students in the class, surprisingly only a handful actually travelled and have some degree of exposure to the ASEAN	Few travelled and some degree of exposure only	Prior knowledge	

Appendix 28 (continue):

Transcript of P11	1st cycle coding	2nd cycle coding	Researcher's reflection
We were not sure exactly what we were learn…….. Much of our understanding were from our impression based on social media.	Anticipation of the learning technique	Learning outcome	In the process of knowledge acquisition using mobile technologies, student's learning behaviors also altered. Supporting & complementing each other learning become crucial factors. It is not about the mobility of learning or mobility of the learners, it has a lot to do with coming together impact on learning that is how students themselves generate new understanding (We were not sure exactly what we were learn.) which they can further share & discuss to make learning meaningful. (we were able to generate an overall impression). The 'I learning (I am in fact very much surprise of the outcome of the learning activity) and the 'We learning' creates the bonding that makes learning interesting. (SRL-CRL).
In the process of our sharing, we were able to generate an overall impression of what ASEAN was about and how as a region, the people integrate and yet maintain the uniqueness among themselves.	Knowledge sharing	collaboration and knowledge co-creation	
If we can establish friendly relationship with social interaction to help in learning….	Friendly relationship via interaction	Develop learning friendship	
As I share my learning, I have also discovered some other interesting interaction from my friends.	Mutual gains from information sharing	collaborative learning and new knowledge formation	Student recognized the mobile-aided discussion was about collaborative learning, as shown by the comment.
To add on to my understanding, I have also sought help of my classmate who has performed the same task with various participants.	Sought help from classmates		Students are empowered & encouraged to share what they know with each other & the external expertise to enhance learning performance as a whole.

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Appendix 28 (continue):

Transcript of P11	1st cycle coding	2nd cycle coding	Researcher's reflection
In particularly, I am interested in three interviews from Malaysia, Philippines and Indonesia.	Flexibility in work selection	Student autonomy	Learners invent new ways of interacting that create new rules and exclusive communities. The mobile systems provide meaningful communication. Student is able to use the communication apps individually or collaboratively.
I obtained the information from my friend her name is Poy using group line. I asked for her assistance and she agreed to share her learning with me.	Seeking permission and agreement to use other's work	Ethical sharing and learning: New learning norm- scouting in learning	

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Appendix 29: Transcript of Participant 12 (P12)

Transcript of P12	1st cycle coding	2nd cycle coding	Researcher's reflection
I have notice the difference between the what we live and learn and behave in our daily encounter. I am Penpassorn, a Thai student studying at International college. This is where I am exposed to many students from Asean, However, it is still insufficient to truly understand how people live and work in this diverse region.	Greater sense of awareness . Still think that more need to be learned. Felt that exiting knowledge not sufficient for real understanding.	See the need to learn	Student sought linkage from her learning environment to the task. She was aware that the exposure was not to provide deep understanding. However she acknowledged the diversity of the new environment which she needed to learn about.
Old mindsets are not the same either.	Change in mindset	Formation of new perspective	Old mindsets- student believed that there were still much to be learned. Eagerness to expose was shown in this remark. "..... these are mainly facts and figures. There is little written on how on....." This statement showed that the student was aware that facts and figures could only help them to reproduction and not construct knowledge. Construction of knowledge is necessary when information is limited and it is of real world relevance.
Although there is many information on Asean, these are mainly facts and figures.	Explicit knowledge easily available. Facts and Figures	Shallow knowledge	
There is little written on how people are affected by the changes in their societies.	Lack of implicit knowledge of people experiences	Lack of knowledge sharing which enables deep understanding	
As all my participants are from Singapore, my task is not fully completed.	Aware of task requirement and understood task not completed	Task oriented	ML provides many opportunities where these processes can be mediated using mobile technologies. Motivating students to use mobile technologies blended with web based technologies can provide resources that aid knowledge construction that are reusable, sustainable and scalable to a wide group of students.

Appendix 29 (continue)

Transcript of P12	1st cycle coding	2nd cycle coding	Researcher's reflection
Using the Line to ask for permission for assistance is a good strategy.	Seeking permission is a good strategy in learning	Good learning attitude - asking and sharing information	Civic responsibility in ML: Student gained deeper understanding of the meaning of civic responsibility in ML and she was prepared to serve back the community by sharing her own learning. Student expressed happiness in learning signified a sense of satisfaction from fulfilment of civic responsibility, support from peers, and being able to offer support back to others. It is also clear that civil engagement among the classmates foster stronger relationships.
I know that to cover more countries, I could ask my friends.	Understand learning limitation		
If we ask for permission, it is like you are asking them to be part of your work. It is not copying. It is like sharing because the other person knows and allow you to make use of the work done.	Asking doesn't denote copying. Sharing with approval		
Personally, I will be happy to share my work because I know it will help my friends to understand more and at the same time, we become better classmates.	Feel happy to share work and become better friends		
When work was borrowed, I take time to read and arrange them.	Share, read and arrange	Proactive learning	This statement denoted meaningful mCSCL contribution in knowledge sharing. Joint effort enriched learning experiences (Time to read and organize information).
I selected 4 countries to analyze. Singapore, Cambodia, Philippines and Vietnam. I think it is good to have a developing country like Singapore, a fast developing country like Vietnam and Philippines and a slow developing country like Cambodia.	Planning with good reasoning to make learning richer	Proactive learning and learning with strategy. Indicating metacognitive process in learning. Multiple level of understanding and able to make meaning comparison based on categorizing subject. Create deeper meaning in report writing	Evidence showing that when the student explored an area of learning, it stimulated deeper critical thinking (fast developing countries vs slow developing country).
Understanding Asean from these countries with different rate of economic growth, I believe I could develop better impression of Asean as a region for work and living.	Strategize learning create deeper impression in learning		

Appendix 29 (continue):

Transcript of P12	1st cycle coding	2nd cycle coding	Researcher's reflection
With my friend work, I understand that Asean as a region is growing. But each of the 10 nations developed at different rate and they have different work attitude and expectation.	collaborative learning extend learning under time constraint	Effective collaborative learning enhance performance	Student recognized the mobile-aided discussion centered on collaborative learning (demonstrated by the comment)
The richer countries stress more on the quality of work and living while the fast-growing countries work hard and have strong hope for better life. People in the weaker economy country still struggle with the thought of getting more work to survive.	Assessment of learning	Evidence of learning and Evaluation of learning	Evidence of metacognitive skills in analyzing and applying the information for insightful understanding.
Asean is a colorful region with many diverse ways of life and types of work opportunities.			

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Appendix 30: Transcript of Participant 13 (P13)

Transcript of P13	1st cycle coding	2nd cycle coding	Researcher's reflection
However, these trips are short and I am unable to truly understand how it is like living and working in these countries.	Unable to truly understand	Prior knowledge	
I will engage in social interaction to find out what people think their life and working experiences in their countries.	Social interaction	Social learning	Teacher introduced an authentic environmental education task (ML in authentic contexts) in a mobile context (use ML in contexts where learners are mobile oriented Mobiles is a mediation tool (Use ML to mediate K construction). The real world context in this case refers to the personal meaning & relevance, allowing deeper understandings to be achieved. Problems, challenges, investigations & explorations that mobile learners engage with are situated in real world contexts that have personal meaning & relevance, allowing deeper understandings to be achieved. The contexts may be commercial, educational or purely lifestyle & will often involve characteristics of collaboration, reflection & articulation. Students: ▪ Discussed & negotiated a focus topic, resources and activities ▪ Planned the interview questions ▪ Captured info & images for learning purposes using a mobile phone ▪ Shared and reflected on content and pedagogical content of K ▪ Modify understandings emerging from reflection & discussion. P13 gave thought to the steps in getting the task started. She prepared Qns that she might ask in the online discussion (SRL)
To begin my task, I first asked myself who can I ask for the interviews.	I first asked myself	Awareness of task	
The list of questions guided me to cover areas I needed to focus.	Need to focus	Sense of responsibility	
My participants are from 1 country this is lacking… I need to source for more.	Need to source		Evidence of self-assessment on one's work and trying to meet the requirement for better performance.
I must select the right person to text to.	Select right person		This indicated self-efficacy & tactical in approaching individuals for discussion by setting selection criteria in the selection.

Appendix 30 (continue):

Transcript of P13	1st cycle coding	2nd cycle coding	Researcher's reflection
My criteria of participants are ……..	Set criteria	Task standard	
To help me to ask question, I participated in class in developing a list of possible questions that I could ask when I interview my 'social friend'.	Participation in activity	Engagement in task	Cognitively active learning behaviors (deep learning approaches) vs Cognitively passive learning behaviors (surface learning approaches)
This assignment makes me more outward in searching for the information I needed	Outward search for information		Access of Online Repository It's not search & report on what you really understood and can't be applied but the essence of deep learning is understanding —true knowing. That's a good start but it doesn't do much to help students see the difference between deep & surface learning or to help persuade them that one is preferable to the other.
We managed to see our similarity and differences among our interviews. This is one way, I figured out what people went through in their lives.	Impact of discussion	Collaborative learning/ Group involvement	Together, students (shared regulated learning) incorporated what they had learned from the actual environment (situated learning) to solve a problem (knowledge gap in the task) - Collaborative effort of the learners, teacher and experts to a solution (narrow the knowledge gap of the context and subject) Keywords: Managed to see / asked to compare / Figure out
My lecturer asked everyone to compare note to create some impressions from the people we have 'chatted'.	Group discussion		
We managed to see our similarity and differences among our interviews. This is one way, I figured out what people went through in their lives.	I figured out		
This is useful. Everyone in class tried to give some suggestions and we developed the list rather easily.	Everyone tried		Evidence of collaboration and seeing the value added to the learning process.
This sharing will add to my understanding.	Knowledge sharing		

Appendix 30 (continue):

Transcript of P13	1st cycle coding	2nd cycle coding	Researcher's reflection
I am aware that my two interviews were all from Myanmar and they do not give me an overall impression. I approached my friend, Poy for additional information.	Seek friend help for work done		Evidence of self-assessment on one's work and trying to meet the requirement for better performance.
I started with my closest contact first. My friend later recommended another friend to me and I managed to conduct 3 interviews.	Friend make recommendation	Develop learning friendship	The mobile phone helped student to process, organize, store, and recall the information she needed anytime and anywhere. Evidence of Innovative learning practices: the learning process is student-centered pedagogy ('The hand phone was all we needed') with extending learning beyond the classroom. Evidence of the mobile hardware enhancing learning by: 1. Gaining knowledge 2. Skills 3. Experiences Evidence showing that student had the ability to work with multiple types of input from mobile devices: 1.Identify (who to contact) 2. Comprehend (Discuss about findings) 3. Organize & categorize learning (Find key concepts/Compare findings) 4. Synthesize information (Create understanding and the rationale behind the understanding) Learning can be even more effective when learners converse with each other, by interrogating and sharing their descriptions of the world ('The more we talk, text and listen, the more we can understand.....After talking with others and among ourselves, I could see a 'bigger picture' of people life ').
As we discuss, we looked at the massager on our phone. It was a paperless process for us.	Use of mobile in discussion	New Learning technique	
Some of my friends printed out their conversation. But in my group, the hand phone was all we needed.	Mobile as a learning tool		
All information was captured, stored and retrieved instantly. We were able to discuss without any problem.	Easy of capturing, storing and retrieving information		
We tried looking at key concepts and compared our findings.	Look and compare key concepts	Deep learning involving cognitive skills	
But we create the impression based on other's people sharing. So, the more we talk, text and listen, the more we can understand why the differences and not just what are the differences.	Understanding WHY and not just WHAT		

Appendix 30 (continue):

Transcript of P13	1st cycle coding	2nd cycle coding	Researcher's reflection
After talking with others and among ourselves, I could see a 'bigger picture' of people life. It was like we cooking Tom Yum Soup. We add more ingredients and create a new recipe with what we have. The end product is a very 'aroy' homemade Tom Yum soup and how spicy the soup depended what people told us.	Metaphor 'Tom Yum soup'	Co-creation in learning	Evidence that ML not only enhanced knowledge acquisition but also greater interaction within a community of practice. Signal that mCSCL in ML activities helped students to develop metacognitive skills. The metaphor of a common dish reflected the interweave of the learner's everyday life and into her web of personal knowledge, interests and learning needs.
I have learned many things from this class and this project. First, with mobile interaction, I am confidence to talk to strangers in different countries that I have never being (been) to	Confidence to discuss	Learning space and new skill	Teacher introduced an authentic environmental education task (Use ML in authentic contexts) in a mobile context (use ML in contexts where learners are mobile). Mobiles is a mediation tool (Use ML to mediate knowledge). Mobile devices could support MCSCL by providing other means of coordination without attempting to replace any human-human interactions. Mobiles leverage learning Student revealed that mobile devices complemented and add value to the new learning styles (If I don't have the mobile technology, it (interview) will be impossible. Reduce time-consuming tasks)
If I don't have the mobile technology, it (interview) will be impossible.	Mobile as a learning tool	Benefits of ML	
It is a low cost learning method	Low cost learning method		
By interacting, they share their culture with me.	Learning other culture through talking	Social learning	
I think the more we talk to people outside the classroom, the more interesting things we will receive.	Stepping out of classroom to learn		People as the more knowledgeable others: The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. Creating real social contexts in which new knowledge can be delivered to learners provides them with a rich opportunity to simulate real life.

Appendix 30 (continue):

Transcript of P13	1st cycle coding	2nd cycle coding	Researcher's reflection
I think asking permission to use one work is like group work except that you can select those work you want to add-in	Asking and selecting	Ethical sharing and learning: New learning norm-scouting in learning	Evidence: The blended approach had made learning more accessible and flexible. Student saw the learning as important (successful) and that she was in control of the activity, able to approach people for the learning, asking questions, collaborating with other people, seeking out new knowledge, and planning new actions. As such, being in control reduced the pressure and increased enjoyment and satisfaction of the learning activity.
This is not like the past. When we take people's work seriously and respect their work by asking.	Respect people work		
The important thing I learned from doing this assignment is that if the task requires you to share and learn, the pressure is less.	Share, learn with lesser pressure	New Learning technique	
You know you are doing an individual assignment but you also know teacher and classmate can also help you.	Individual work with help available		Unlike previous classes attended by the student, she had the opportunity to interact with her peers. This in a way helped her to develop and grow intellectually. The opportunity of interaction between peers had the potential to create a Zone of Proximal Development (ZPD). Vygotsky (1978 p.86) defined ZPD as the distance between the learner's current knowledge "actual development level" and the desired level of development or performance that happened with the assistance from the more capable peers.

Appendix 31: Transcript of Participant 14 (P14)

Transcript of P14	1st cycle coding	2nd cycle coding	Researcher's reflection
To fully understand the way of life of the Asians is not an easy task.	Not an easy task	Awareness of task	Student's remarks showed that the assignment was not an 'easy task' but it was possible to achieve because the tool used was free and effective in terms of the interaction with the participants. Therefore, the teacher had selected a good tool to support the learning and enabled student to meet the learning objectives ('The takeaway was sufficient to give me some good impressions').
The task is to make use of our mobile applications to contact and connect the participants at no cost.	Contact and connect		
I have travelled to a few countries in ASEAN, I have visited Laos, Myanmar, Cambodia & Spore.	Prior knowledge	Knowledge of topic	
I hope that I will be able to identify similarities and differences among them.	Identify		The learning loop 1.Generated list of questions collectively 2. Learning something new by asking more questions (Creating new knowledge) discussed with each other (discussed discoveries & experiences) 3.Carried out further investigating into the unknown (what had been mentioned and was unknown to you) 4. Reflecting on new-found K
The takeaway was sufficient to give me some good impressions.	Good impressions	Bridge knowledge gap	ML fostered collaborative learning activities for sharing & managing K. Indeed, the system could improve collaboration via interactivity that might lead to better decision making.
This learning will add to my understanding	Add to understanding		
It was an amazing experience because not only I got the information I wanted, I also got the chance to talk to friends & stranger.	Got the information	Access to knowledge	Use technology & other media to understand authentic situation created many possibilities for engagement. When students could see what they done in class could be applied to real-life situations, they became active.
They met my expectation in terms of their willingness to 'talk'.	Willingness to talk	Linking people to content	Discussed discoveries and learning experiences
I realized that even while driving, someone was still happy to assist me.	Happy to assist	Connecting people to learning	

Appendix 31 (continue):

Transcript of P14	1st cycle coding	2nd cycle coding	Researcher's reflection
Due to the ease of communicating and familiarity of using mobiles to texting and calling, I see this task as easy and 'Sannook'.	Ease of communication	Interest in topic	P14 was asked by the teacher if she had all the three respondents required for the task. She said she needed one more and I asked if she was interested to conduct another interview in class. She was a little taken back with the immediate task given. She took the chance and contacted the person (from the teacher's social network). The person she contacted was in Singapore and agreed to have a conversation with her but he was unable to text and offer to do a video call. P14 and one of her friend decided to work together - with one interviewing and the other taking short notes. All together, they had 5 digital tools on hand to carry out the task. P14 found out that the participant was actually driving and using Bluetooth. She started asking questions based on her prepared list and realized she could not ask all the questions and decided to ask in another format. Have u ever been to Thailand? Do you see the difference in the way we live and work based on your experiences? It was a question that the participant was able to answer in a free flow manner. He was able to provide an explanation that the student could comprehend.
Initially, in the interview, I asked a list of prepared questions. But then, I realized that Mr. Lim was driving, so, I cut short the list by forming a simple question. My question was have you ever being to Thailand and how is Thailand different from Singapore?	Forming simple questions	Spontaneity in learning	Student was adaptive to the situation and was able to make it easy for the participant to effectively assist her via constructive conversation.
The mobile technologies such as Bluetooth have helped to make learning and sharing possible.	Bluetooth	Learning technologies	

Appendix 31 (continue):

Transcript of P14	1st cycle coding	2nd cycle coding	Researcher's reflection
The 1st was carried out a video call and the second was done on Facebook Manager chat.	Video call and manager Chat		
I make a search about YK Ship.	Make a search	Proactive learning/ emerging activity	Access of Online Repository Student after the interview became curious about the workplace of the participant and did a search for the company name provided. As an effort (SR process), the student refined her knowledge of subject content.
I was rather surprised that I managed to complete the task in such a short time.	duration to complete task	Time management	Using MIM, P14 had to express herself concisely as the interviewee might not have the time for a long interview. In addition, there was no need to text or chat in a formal way as the conversation took place informally.
I started to ask my friends and we decided to share our information with one another. It was for mutual benefits.	Mutual benefits	Collaborative learning	Collaboration is not necessarily accomplished by just assigning students to groups and telling them to work together. Students have to take their own initiative and judgement to the collaboration process. Students are empowered to approach and select the work that best fit their own work criteria. Hence, they need to develop their capabilities to work cooperatively together. ML provides opportunities for students to create their own knowledge based on their mental concepts and prior experience. Additionally, users can share their knowledge based on their constructed knowledge.
I approached Tracy to get the interview by Mr. Kang Shuien from Malaysia. This interview was shared by my friend Book. She interviewed Miss Santi Dwisaputri Tedjakusuma.	Approach and shared interviews		
I want to say thank you to Tracy and Book	Say Thank you	Appreciation in sharing	
I am confidence to talk to strangers in different countries that I have never been to.	Confidence to talk	Communication skill	New skills developed: ability and sense of confidence to communicate with strangers for learning purposes.

Appendix 31 (continue):

Transcript of P14	1st cycle coding	2nd cycle coding	Researcher's reflection
My first exposure to an Asean country was actually when I was a freshman in the university. I had the opportunity to follow my university on a school networking project.	First exposure	Knowledge of topic	Student integrated prior knowledge to current task.
I realized that there were some differences & similarities in terms of lifestyle & culture between Laos & Thailand	Prior knowledge		
This learning method is very extensive.	Extensive learning	Learning method	Learning approach: Extensive (covering a large area). It implied applying learning in the new context and learning beyond curriculum. It's a hands-on based learning method.
When I enrolled in the course of Asean Economics and Trade, I began to expand my understanding.	Expansion of understanding	Bridge knowledge gap	Velocity of the learning - speed of occurrences
They were happy to share their knowledge when I explained the purpose of my mission.	Purpose of mission	Awareness of task	Benefit of social learning: People are more willing to chat on an informal basis when they are aware of the purpose of the interaction. Objective of learning activity must be clearly stated and approval of the participants is needed.
I got the chance to interview a few people in Asean countries about how they live and work in their countries.	Interview		
Before I interview, I have to identify who I can talk to and how I should approach them.	Identify who to talk	Student autonomy	Active learner: engaging in the working process of the task. Thinking about the execution ("who I can talk to and how I should approach them"
We all wanted to improve our learning. We monitor who does what and who has what so that we know who we can ask for more.	Monitor who does what		Goal setting of the student: When they set own goals for assignments (We all wanted to improve our learning) & then work to achieve those goals (We monitor who does what & who has what) then work becomes serious & meaningful (we know we can ask for more).

Appendix 32: Transcript of Participant 15 (P15)

Transcript of P15	1st cycle coding	2nd cycle coding	Researcher's reflection
I even plan a list of questions so that my participants can have a smooth convenient and understand what I need task to ask.	Plan a list of questions		Active learning in progress
As I discuss with my classmates, I also discovered some other interesting information on Singapore. It was an interview by Rosa with a Singaporean.	Class discussion/ discover interesting information		
By listening to more stories, I desire to work more on it for better understanding as well as performance of the assignment.	Desire to work more		SRL with the supported information from peers/ Knowledge Construction: Student was able to show her ability to integrate information from different sources to create content. P15 experienced positive learning affect ('I desire to work more on it for better understanding.'). She created a trustful partnership ('I have never thought I could talk to strangers ....') that resulted in positive gains ('.... and how I can use it to form my personal impression of what Asean is about.')
I have never thought I could talk to strangers using message applications called Hello Talk.	Talking to strangers	Mobile communication skill	Innovative learning method
"Hello Poy. Nice to meet you. I am working. How about you? What's your major?	Friendly greeting	Develop learning friendship	Analysis of the conversation Participant was willing to bring his diverse personal experiences and added richness and diversity to the conversation. The language was more informal and personal, as an indication of participant's willingness to find an appropriate time to deliver the information. There were indications of emotions and empathy in the conversation.
"Hello Poy, I am sorry for the late reply…. Sure! I'd love to help you. When are you going to pass the project? And I can teach you English too."	Apologize for late reply and being helpful		
"LoL wow so long. I will type later na I'm working now."	Did not reject request		

Appendix 32 (continue):

Transcript of P15	1st cycle coding	2nd cycle coding	Researcher's reflection
"Ahh, What interview you want? How do you want to do it?	Willing to assist		Analysis of the conversation The collaborative effort by the student and her participant had created a safe and welcoming learning space & this had a significant impact on the manner in which student opened up herself as indicated in her reflection of the learning process "they were willing to help even we don't know each other before..... we can gain more by talking and sharing experiences". As participant grew more comfortable, she became more friendly and supportive in the learning ("I am done. Hope it helps in your project"), the learning space was enriched in a way that being alone could not have achieved ("My general impression of Asean based on my mobile interaction").
"I am done. Hope it helps in your project."			
They were willing to help even we don't know each other before.	Received help without problem		
My general impression of Asean based on my mobile interaction.	Mobile interaction	Social interaction	
We can gain more by talking and sharing experiences	Talking and sharing		
This is my observation based on my understanding through interaction.	Observation via interaction		
I have also sought help of my classmate who has performed the same task with various participants.	Sought help of classmates	Mobile collaborative learning	The technology provided a shared conversational learning space, which could be used not only for single learners but for groups of learners. Student displayed ability to control her learning. Using her mobile apps, she not only planned her work (interaction for understanding) but also monitored the work of her friends (I obtained the info from my friend using our group Line) for good (mutual) sharing of learning, evaluating, & regulating her behavior.
I obtained the information from my friend her name is Book using our group line	Obtained information via Line		
The sharing and transfer of information are surprisingly not that difficult because of mature (mutual) needs.	Sharing and transfer of information	Knowledge sharing	
I asked for her assistance and she agreed to share her learning with me.	Agreeing to share		Both learners have the ability and willingness to manage, regulate and plan their learning process together.
I started with 3 interviews but with interaction & sharing, I managed to discover more than what I have expected.	Discover more than expected	Learning expectation	Greater value in learning

Appendix 32 (continue):

Transcript of P15	1st cycle coding	2nd cycle coding	Researcher's reflection
The combination of work enhances the quality of the report and our knowledge.	Enhance quality of report	Learning outcome	Product: Positive outcomes
It is amazing that without crossing to these countries, we are able to socialize with people to gain information that it is not possible if we do not have mobile as a tool to learn.	Without crossing these countries	Crossing of boundary with ML tool	The dynamism of ML via conversation
I opine that learning out-of-class is interesting and rich.	Interesting and rich	Out-of-class learning	"cultural, social, and personal sources of influence that together challenge, shape, and guide co-regulated identity" (McCaslin, 2009, p. 137). Co-regulated learning makes student more independent in her SRL (We engaged ourselves to contact people and think carefully of what was said to us.
…with this assignment, we engage ourselves to contact people and think carefully of what is said to us ….	Think carefully and how to use information	Cognitive engagement in learning	
and how I can use it to form my personal impression of what Asean is about.	Form personal impression	Applying knowledge into action	Satisfaction and confidence in learning

Appendix 33: Transcript of Participant 16 (P16)

Transcript of P16	1st cycle coding	2nd cycle coding	Researcher's reflection
Jeeranat interviewed three individuals from Laos. They are Ningnong, Jele and Ramangkoun. Jeeranat was the last student to submit her paper. Her work is incomplete. She was inactive in group communication. She was not actively engaged in the learning activity. Recommendation and suggestion for improvement by the teacher was ignored. She did not request for any help.			P16 failed to engage in collaborative learning as her report only presented her own interaction with her participants. She did not spend sufficient time with her peers to understand and coordinate their interactions. This supported the explanation that co-regulation might fail between students, when an imbalance in student's regulatory surfaced. This lack of time-management in collaborative work led to poor quality of work. Her inactive SRL behaviors had impacted her learning process especially in collaborative work and performance. P16 joined my next class in the new semester and I had noticed that she had become much more comfortable in the ML classroom environment. I called her name several times in class as I have noticed her eagerness to answer questions. She interacted much actively in class discussion and made effort in case analysis. She took initiative in information searching, a new learning behavior which was not visible in last semester class. When I told her of the observed changes, she smiled and said she tried to be better and she thought it was time to change. She was glade to receive the feedback and indicated her continuous effort to interact and contribute to class discussion

Appendix 34: Transcript of Participant 17 (P17)

Transcript of P17	1st cycle coding	2nd cycle coding	Researcher's reflection
I have little knowledge about how life is like in Asean. I must admit my understanding is still very shallow.	Little knowledge	Knowledge of topic	Student confessed that she could not remember facts as there were too many. She indicated that the easiest way was to talk with people with the knowledge or experiences on the selected issues. Social learning was seen as 'easiest way' to get insightful information. Co-regulated learning allowed student to gain more than just explicit information. The interaction enabled insightful understanding as people shared the social and economical implications of the phenomena.
I don't remember much fact because there are simply too many things one needs to know about Asean.	Can't remember fact		
I think one of the easiest way is to talk with the Asean people to hear directly from them how life is like for them at work and in daily living.	Talking is the easiest way to learn	Social learning	
I know that Yangon is the biggest city in Myanmar but I still thought it's the capital city of Myanmar. Through my inquiry, Yangon was formerly the capital of Myanmar but the capital of Myanmar moved to Naypyidaw.	learning from interviewees		Evidence of new knowledge formation through social learning and interaction Student remarks showed improved/ better reasoning skills and higher level of self-confidence
Before I studied this subject, I only know Malaysia is famous for Twin Towers. But now I learn more about Malaysia.	learning from interviewees		
Studying can be an interesting thing. We not only chatting with others, but also get knowledge from that.	Chatting allows knowledge generation		
To get new friends and easier to understand the knowledge of Asean. Improving self-learning by asking questions	Asking questions enhance understanding	Communication and learning strategy	Student expressed satisfaction using ML. They found it interesting, motivating and more effective than conventional classroom. She was also more willing to continue learning via mobile technologies because she was able to chat with more people and might learn something more than class learning.

Appendix 35: Transcript of Participant 18 (P18)

Transcript of P18	1st cycle coding	2nd cycle coding	Researcher's reflection
I know that some of my friends have completed some good interviews and I asked them to share and helped me.	Request for sharing of information	Mobile collaborative learning	Evidence of connectedness in ML environment.
Reading the Line message from group, I found out that a few friends have good done some interviews.	Usefully group messages		Proof of increase in interaction with both classmates and teacher.
When I asked them, they were happy to help me.	Willingness of friends to help		
I don't think I have prepared a good report relating these experiences of Asean but with the help of my classmate and teacher, these interviews become richer.	Help from classmate and teacher		Satisfaction in learning
The interaction allows me to understand how people live and work in Asean countries.	Interaction and sharing experiences	Social Learning	ML not only fostered the way we accessed information, but also helped learners be innovative and good problem-solvers, (West, 2013). The learning tasks and learning experiences allow student to reflect the complexity of the environment in which learners would work.
These interviews let me understand the experiences that are not known to me.	Unknown experiences	Knowledge of topic	
However, these are simple interviews and basic interaction and do not give me the depth of my understanding.	Simple interviews	Depth of learning	Limitation in social learning
The sharing has make the interviews outcome better	Sharing enhance learning	Learning outcome	Satisfaction in collaborative learning. Overcome learning shortfall of the student.
I am very happy with the outcome of these interviews			

Appendix 36: Transcript of Participant 19 (P19)

Transcript of P19	1st cycle coding	2nd cycle coding	Researcher's reflection
My general impression of Asean based on this info have changed my earlier perception of Asean.	Acknowledged change in perception		The ML process facilitated students to interpret reality & that broadened K & perception about it. (have changed my earlier perception.)
I also asked if she is satisfied with her current pay & her reply is that it would be good to have an increase but she understand the current economy is not that good & it is better to think of how to save & reduce unnecessary spending.	knowing with explanation and greater understanding	Knowing with understanding	Actively learning process Evidence supporting actively learning process: Student asked more questions, discussing issues, and sharing ideas.
My interview with Ms. Gin was an interesting one. I decided to look into how the Singapore government help and the meaning of Central Provincial Fund (CPF) that Ms. Gin mentioned.	New information leads to further search for understanding	Interest in topic and Metacognitive learning process indicated. Also signify the regulation of learning when student extended the search after the interaction	Access of Online Repository
I searched the internet and read an article entitle 'Tackling Singapore's baby shortage'.	New information discovered through search and read		Access of Online Repository The ease of access to learning resources and assessment increased her knowledge and motivation for learning. Attention focused on: P19 searched the internet on a specific information which signified focused attention. This directed attention drove the student to explore further. Evidence showed that P19 used multimedia information to enhance cognition, ease off learning anxiety, heightened learning motivation, and have enough visual and auditory support to meet learners' learning needs in reading and listening skill development.
From the article, I discover that Singapore has a low birthrate of below 1.4. This means that an average Singapore woman will has one or no more than two children. This rate is below the replacement rate of 2.1 to maintain population levels. To encourage people to give birth, the government give cash grants and subsidies. There is also more flexibility at work to assist young mothers. This changes work culture in Singapore.	Deeper understanding and able to assess the situation based on further knowledge search online		
I got the chance to speak to him using Messenger. It was an easy way to talk and share social experiences.	Ease of learning with communication applications	Advantage of using mobile in learning	

Appendix 36 (continue):

Transcript of P19	1st cycle coding	2nd cycle coding	Researcher's reflection
The conversation was on 10th September 2017 and lasted 50 minutes.	Time involved show commitment in collecting data	Commitment in learning and time investment in task	Substantial amount of time invested in the conversation
When I asked him questions, he was happy to answer me. He said it does not matter, because we are friends. I am glad to learn a lot about his life and work from our communication.	Rich information gather as participant was happy to interact	Participant willingness to interact ensure quality knowledge sharing	Student was able to externalize understanding based on the conversation that took place. It enabled individuals to employ and sharpen their tacit knowledge into explicit formats
At first, I was happy for him. He said that because of this matter (green school in Indonesia) had to work overtime, because the school to hold a celebration. He thinks it does not matter because the school will give him a bonus.	Sense of feeling for participant situation	Establishing bondage in social interaction	
In addition to the above, we also talked about insurance. Did I ask him to buy insurance? He said he was fortunate to get a free insurance in this company. In his view, he thinks the insurance is good and necessary, when he encounters illness or something bad when it comes to use it, I agree with him.	New question posted/ a new area of understanding	Asking more questions and develop new understanding	
I agree with him. We cannot predict what will happen, but insurance has some protection.	Comprehending and agreeing to participant standpoint		
My general impression of Indonesia based on the conversation with Salmam Zumba is that many Indonesians migrant to the city for work.	Able to make assessment of the information acquired		As knowledge is filtered through the activity and interactions, it gradually becomes classified, codified, and documented.
Biew is my friend who comes from Thailand. We were friends when I was traveling in Chiang Mai.	Re-establishing old social link		

Appendix 36 (continue):

Transcript of P19	1st cycle coding	2nd cycle coding	Researcher's reflection
I am studying in Thailand, for the understanding here is more than nine other ASEAN countries, so I and my classmates discussed our interview in class. They have many same places. There are a lot of people who leave their hometown to go to a large town to work, they rent a house living near the work area. I live with family, may also be shared with friends. Their salary is not high but happy to work.	Collaborative learning through discussion and sharing of information. Able to make assessment and gave a summary of the findings	Indication of metacognitive process in learning.	

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Appendix 37: Transcript of Participant 20 (P20)

Transcript of P20	1st cycle coding	2nd cycle coding	Researcher's reflection
Asean Economics and Trade is a fun class. Fun to talk to different people	Fun class. Interactive activity	Social learning	Student perceived class as 'fun' & interactive 'fun to talk'. The course is designed based on mCSCL. This ML activity focused on the mental development & triggered the cognitive ability of the learners. Teacher encouraged cross-boundary learning allowing students to have access to diverse knowledge. That sensation was what Zhu cited as "Really experienced by yourself is better than copying all from book".
Really experienced by yourself is better than copy all from book.	Experiential learning via interaction		
After talking to Harry for about a month, I message Harry again to see how life is right now.	Follow up	Continuity in interaction	Student was committed and motivated to improve her learning experience. P20 was self-directed and took the initiative to follow up on her conversation with her participant.
About differences between Jakarta and Bali, she chooses Jakarta because have more opportunity.	Asking more questions	Depth of interaction	
I also asked him did you get any financial help from your parents like car or apartment he replied that including him most of Singapore kids are independent and they do not rely on their parents that's much.	Asking questions out of the prepared list		Evidence showed that ML supports inquiry-based learning
Before doing our project, I know that most of ASEAN's news come from the media. To understand how people, live and work in ASEAN, I managed to connect and interact with three individuals from three countries using my mobile as a learning tool.	Mobile as a learning tool enable interaction	Awareness of task	Inquiry-based learning is student-centered and active learning approach that focused on questioning, critical thinking, and problem solving. Activity started with a question followed by investigating solutions, creating new K, discussing discoveries and experiences, and reflecting on new-found K. Motivation processes in Self-regulated learning: Motivation explains student's engagement & persistence in any educational tasks (Puzziferro, 2008).

Appendix 37 (continue):

Transcript of P20	1st cycle coding	2nd cycle coding	Researcher's reflection
I even fly to Indonesia to meet my participant and experience life there. I spoke to some western people" and found out that "most of Aussie people told me they will bring family their come once per year. Because things here are cheaper and quality is also good". To experience the local living, P21 cited that "I spent two days there. The first day, I live like a local people" and spending "only 50 dollars (1,200 baht)" But on the second day, she spent like a tourist costing her 400 dollars (9,800 baht) "for taking a boat to island and eating nice food in good restaurant".	Explore by traveling to destination	Proactive learning/ emerging activity	Evidence highlighting mobile technologies helped increase individual's organizational skills and self-regulatory capacity of learning through planning and the application of knowledge ("I even fly to Indonesia to meet my participant and experience life there").
With the interview with Harry, I began to search more information about Singapore.	Information search on topic		The mobile phones' technology could bring real life in front of learners. This student administered her learning base on learning content, browse, and retrieve it whenever she wishes.
I recorded their answers and I also wrote every part in my phone and I kept the data in my laptop as backup	Recorded note on phone and backup	Data management	
I didn't have any difficulty all of my friends are really helpful and co-operative to me.	No problem in asking for help	Collaborative learning	Not having difficulties reflected the psychological comfort affects of not having to face cognitive load and the speed with which users could perform tasks collaboratively.
Actually, the teacher in this class is not just reading through the books she want us to experience by our own self. It's more fun to have this kind of class that let us experience outside world.	Learning from outside world	Learning boundary	Remarks highlighted the teaching strategies that upheld situational and context-sensitive leanings.

Appendix 37 (continue):

Transcript of P20	1st cycle coding	2nd cycle coding	Researcher's reflection
It (mobile) gives me an edge so that I can be more focused on things I wanna do.	Better focus	Benefits of ML	The mobile devices allowed student to socialize, learn, and work across multiple real-world settings. Learner saw these as having the advantage or 'an edge' to learning.
I am always interested in ASEAN personally now I got the chance so of course, it gives me motivation to pursue my interest. If I have to say then it's my interest and my curiosity that gave me motivation.	Motivated to learn because of interest and curiosity	Interest in topic	As P20 actively engaged in the learning process, she also set her performance goals. By identifying her learning goals, she was able to close the gap between her current and expected performance. She was motivated to reassess her knowledge and this is reflected in her follow-up calls to her participants ('I continue to keep in touch with them that's why it took some time to finish').
I spend months to finish the following part because I didn't just interview one I continued to keep in touch with them that's why it took some time to finish.	Took time to follow up conversation	Time management	
Yes, I am engaged I mostly spend my time on social networking and I learn a lot of stuff about the news.	Learning from internet	Engaging in social learning	In knowledge production, teachers determine what and how information should be learned. In knowledge navigation, learners acquired skills to appropriately select, manipulate, and apply information to their own unique situations and needs In knowledge navigation, teachers or experts help learners understand how to navigate through knowledge in order to select, manipulate, and apply already existing information for unique situations.

Appendix 38: Transcript of Participant 21 (P21)

Transcript of P21	1st cycle coding	2nd cycle coding	Researcher's reflection
This conversation with Hilmi is interesting. I think traveling in Singapore is not difficult. Taking buses to work is common. In Thailand, where I am now, traveling by bus is not the preferred way.	Comparing one's experience and make judgement	Cognitive engagement in learning	Evidence of reflection in cross boundary mechanism: Established new perspectives - Making and taking perspective based social learning. Student made new perspectives with the prediction that "in the future, we will see more and better....." development. P21 also exercised her cognitive ability to assess the learning P21 was able to connect herself to the content she had created and this new learning had some how compelled her to integrate the outside environment with the world she was in. This demonstrated that mobiles as enabling tools had the ability to co-create new knowledge and meet learning objectives (in this cross boundary context).
This shows the progress and economic development in Asean countries. In the future, we will see more and better transportation in Asean countries.	Make assessment from learning		
I think the conversation got me to think a lot more	Engaging in more thinking		Statement supporting Metacognitive development in ML. Student being digitally literate meant: ▪ knows how to use information (I decided to search more. According to Wikipedia,), communication technologies and the tools in favor of knowledge processing (..that probably explained....). They read the information & presenting new content. Also grasping, analyzing ('These buses look clean and in good condition. ▪ These bus services were linked to Mass Rapid Transit system or MRT. Traveling in public system is economical and efficient. Owning a car is much difficult') & critically judging ('The conversation got me to think a lot more') these pieces of sourced info & content, building and rebuilding new knowledge from them.
I decided to search more about the public bus services in Singapore. According to Wikipedia, bus transportation forms a significant part of public transportation in Singapore.	Online information search	Proactive learning/ emerging activity	
There are many Burmese working in Thailand. Some who are financially sound, got to study in Thai universities. There is a social gap between the rich and poor in Myanmar. My interest in this country brought me to search the internet.	Associating own observation to reality and explore further		

Appendix 38 (continue):

Transcript of P21	1st cycle coding	2nd cycle coding	Researcher's reflection
I am particularly interested in the family owned business in Myanmar after talking to BrangNu. I read that family businesses are key to Myanmar's economy, generating thousands of jobs and contributing to country's economic and growth.	Express interest in topic and read article	Interest in topic	Evidence demonstrated that students were highly motivated to the learning motivation when they became engaged in the authentic learning tasks. P21 claimed that if not for the conversation, she won't have "go to find out about" the mentioned subject which build on to her understanding of the topic (task objective).
I wouldn't go to find out more about the public transportation system and how these system influence people life.	Awareness enhance desire to discover more	Bridging knowledge gap	
These buses look clean and in good condition. These bus serveries are linked to Mass Rapid Transit system or MRT. Traveling in public system is economical and efficient. Owning a car is much difficult.	Observation from information online	Cognitive engagement in learning	Higher capacity to construct new knowledge. The ease of use, the availability and direct access to the World Wide Web, the possibility to make communication between peers and peers, and peers and teachers easier, and the added value for collaboration reflect the changing nature of learning. Student are much motivated and excited in expanding one's learning.
That probably explain why Mr. Hilmi prefers to take buses to work and only use his car on the weekends.	Reasoning mechanism		
I messaged my friends on our group line to get their permission to use their interviews.	Permission for knowledge sharing	Ethical sharing and learning: New learning norm-scouting in learning	Gaining support from the student's Learning Community - Learners work with others in an effort to achieve mutual goals.
I also wish to thank my instructor for suggesting and recommending the works of my friends to complete the report.	Express thanks to instructor	Facilitating role of teacher	Instructor not only provided the immediate feedback and assessment but also facilitated personalized learning adjusting to the knowledge gained of the particular student and guiding her to the completion of her work.

Appendix 38 (continue):

Transcript of P21	1st cycle coding	2nd cycle coding	Researcher's reflection
This assignment comes with surprises. If I haven't got the chance to talk, I think my understanding is very shallow.	Mobile can enhance knowledge	Leveraging knowledge using mobile in learning	Authentic learning contexts via ML have positive effects (assignment comes with surprises) on knowledge acquisition (If I haven't got the chance to talk, I think my understanding is very shallow). The authentic task involving the real word situations when shared allows students to connect the contents of the textbooks with real world materials to achieve better comprehension and learning outcomes (Putting all pieces together). Student used her mobile tool to retrieve articles for reading, gather data, and to integrate data, shared the learning and use the knowledge to create a map to enhance her understanding. This "map" (map of Asean life" is the product, or the outcome of the learning activity which denotes new knowledge construction.
Learning is more extensive when we share our knowledge. I think if you read other people's work and carefully put all pieces together, you form a more complete "map of Asean life".	Metaphor of Map		
I understood now that this country has a high proportion of business run by families.	New understanding		
If I have not read my friends' work, I would not have understood what Baba and Nyonya meant.	Knowing something new		Communities are no longer solely based on geographical proximity, and new “tribes” are developing and dissolving according to interests, study and work patterns, and opportunities
I am very happy had a conversation with them. It was a good opportunity for myself as I could practice chatting with other people.	Good way to practice conversation skill	Communication skills	
I would like to thank my Asean participants and my friends for helping.	Express thanks to participants and classmates	Ethical sharing and learning: New learning norm- scouting in learning	

Appendix 39: Course Evaluation

Course Evaluation (Asean Economics and Trade)

Dear all, thank you for time and effort for this semester in class. Please kindly fill in your opinions in this course evaluation questionnaire for further improvement in the course design. Your feedback is highly appreciated, May I also have the approval to incorporate your feedback into my research on effective use of mobile technologies for learning.

1 as most disagree and 5 as most agree

	1	2	3	4	5
In/ out of -class learning					
I am satisfied with the learning material provided in class					
I am satisfied with the supporting material provided online					
I am satisfied with the teaching technique in class					
I enjoyed learning in this class					
I am happy with the use of technology in learning					
I have benefitted from the learning in class					
I enjoyed the coursework					
I preferred in-class learning					
I found the external educational trip beneficial					
I make use of my mobile in learning					
I think this class is interesting					
This class has a different approach to learning					
I see the importance of using mobile in my learning					
I have a close relationship with my course instructor					
I have no problem in contacting my instructor					
My instructor is slow in responding to my questions online					
I am able to interact effectively with my classmates in class					
I found interacting with my classmates useful in my learning					
I am able to communicate effectively with my classmates on mobile applications					
I am able to work & learn effectively with my classmates in class assignments					
I value my learning in class					
I value my conversation with people online for learning purposes					
Suggestion & more feedback					

Name: _____ Signature: _____

Student ID: _____

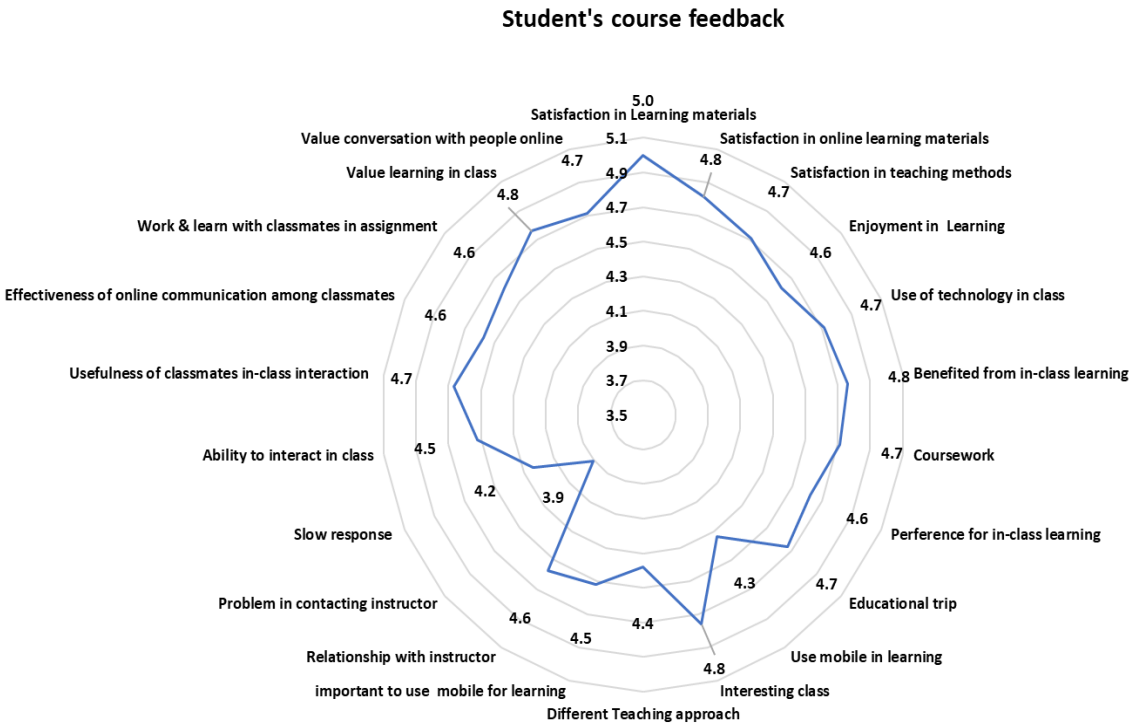
Appendix 40: Feedback from students' survey questionnaire

Feedback from students' survey questionnaire on learning satisfaction in a ML course.

	Learning materials in class	Online learning materials	Teaching methods in class	Enjoyment in Learning	Use of technology in class	Benefitted from in-class learning	Coursework	Preference in in-class learning	Educational trip	Use mobile in learning	Interesting class	Teaching approach	importance of mobile learning	Relationship with instructor	Contacting instructor	Instructor responsing to online questions	interaction with classmates in class	Usefulness of classmates in-class interaction	Effectiveness of online communication among classmates	Work & learn with classmates in assignment	Value learning in class	Value conversation with people online
Student 1	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	4	4	5	5	5	5
Student 2	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5
Student 3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	5
Student 4	5	5	5	4	5	5	5	5	5	4	5	5	5	5	4	5	5	5	5	4	5	5
Student 5	5	4	4	4	5	5	5	4	4	4	4	5	3	4	4	4	4	4	4	4	4	4
Student 6	5	5	4	5	5	4	5	3	5	3	5	5	5	3	4	4	4	5	5	5	5	5
Student 7	5	4	4	3	4	4	3	3	3	4	4	4	3	4	3	4	3	4	3	3	4	4
Student 8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Student 9	5	4	4	3	4	4	3	3	4	4	3	4	4	4	4	2	4	4	4	4	4	4
Student 10	5	5	5	5	5	4	5	4	4	3	5	5	3	5	1	3	5	5	5	5	5	5
Student 11	5	5	5	5	4	5	4	5	5	5	5	5	4	5	5	5	4	4	4	4	5	5
Student 12	5	5	5	5	4	5	4	5	4	5	5	4	5	4	5	4	5	5	3	5	4	3
Student 13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	5
Student 14	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5	5
Student 15	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5	5
Student 16	5	5	5	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5
Student 17	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5	5	5	5	5
Student 18	5	4	3	4	4	4	5	5	4	3	4	4	3	3	3	4	5	5	4	5	5	5
Student 19	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5	5	5	5	5	5	5
Student 20	5	5	5	4	5	5	5	5	5	5	5	2	5	5	5	2	4	4	3	4	4	4
Student 21	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	4	5	5	5	5	5
Average	**5.0**	**4.8**	**4.7**	**4.6**	**4.7**	**4.8**	**4.7**	**4.6**	**4.7**	**4.3**	**4.8**	**4.4**	**4.5**	**4.6**	**3.9**	**4.2**	**4.5**	**4.7**	**4.6**	**4.6**	**4.8**	**4.7**

Appendix 41: A radar chart of survey findings

A radar chart of the students survey findings based on the questionnaires.



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