

Understanding the Implications of Ubiquitous Mobile Technology  
for Mature Adults in Post-PC Era Lifelong Learning

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## **ABSTRACT**

### Understanding the Implications of Ubiquitous Mobile Technology for Mature Adults in Post-PC Era Lifelong Learning

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Handheld mobile devices open up opportunities and challenges for adult learning in today's information-rich and technology-abundant world. Some scholars have argued that mature adult learners, most of whom are pre-1982 generations, take up and make use of mobile devices differently from the youth. This qualitative study examines and juxtaposes the lived experiences, opinions, and suggestions from a mature adult sample and a young adult sample in regards to their adoption and use of ubiquitous computing technologies including the tablet. The research findings suggest a coexistence of commonalities and variances within each age group and between the two groups. The tablet technology is perceived by the mature adult sample to be usable and useful, albeit a few technical limits. Still, this device maintains a low to moderate visibility in the learning activities undertaken by the mature adult learners, which can be partially explained by the mature adults' reserved acceptance of emerging technologies, instant information and online social networking. Social, cultural and technical factors are found to have stronger influences than age on the mature adults' selective and rationalized use of the tablet technology. By attaching more importance to the mature adults as well as learning from their experiences, insight and judgment, the academy, the industry and the society as a whole can expect more socially aware and more socially responsible technologies, which will, in return, significantly benefit the adult learners in their mobile learning initiatives.

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## CHAPTER 1: INTRODUCTION

The recent whirlwind introduction of ubiquitous mobile devices such as smartphones and tablets, along with the quickly matured Web 2.0 and the new upcoming Web 3.0, alters the paradigm and the practice of educational communities worldwide. On the one hand, institutions and individuals are making efforts to integrate emerging mobile technologies into all kinds of teaching and learning initiatives. On the other hand, mobile learning (m-learning), a concept of “anytime, anywhere learning” enabled by mobile devices, is gaining momentum and increasingly being explored as an updated version of e-learning. Rapid uptake of mobile technologies is observed in people who were born in the digital age and perceived by many to be innately tech savvy, technologically fluent, and always connected to the Internet. The ways of capitalizing on and working with the mobile enthusiasm of these young generations thus become the foci of a great many m-learning studies. Much less researched is the adoption and use of mobile technology for teaching and learning purposes by mature adults who were not born into a digital world and did not acquire computer literacy until adulthood. Despite the fact contemporary andragogy interprets learning as a socially constructed and socially mediated activity, the social aspect of the m-learning practice by mature adults remains an under-explored field. This study is therefore undertaken to investigate the use of the ubiquitous mobile technology among the mature adults in their formal and informal learning activities. It attempts to develop a qualitative understanding of the existence or non-existence of the age-based differences in digital use as well as shed some light on the potential of ubiquitous mobile technology in bridging and linking m-learning, lifelong learning, and adult education.

## **Background**

The past few years have seen the alleged downfall of Personal Computer (PC) and the rise of ubiquitous computing devices, with the latter covering the everyday objects equipped with microprocessors and communicate with one another via wireless networks (Stajano, 2002). In 2010, Steven Jobs, Apple Company's then CEO, foretold that PCs are "still going to have a lot of value... but they're going to be used by one out of X people" (as cited in Paul, 2011). Analysts in computer industry also expect PCs to take backseat to mobile devices (Wingfiled, 2012). In reality, market demand for desktops and laptops flattens, and that for netbooks declines (Hamblen, 2012). Ubiquitous computing devices, which comprise mainly smartphones and tablets, experience a global shipment rivaling or even outpacing that of PCs (Shah, 2012; Alto, 2011). Mobile Internet use surges accordingly and will probably exceed desktop Internet use by 2015 (Morgan Stanley, 2010). An inference is made that a post-PC revolution, by which users worldwide replace desk-bound computers with mobile devices, is set in motion (Rauch, 2011; Murphy, 2011). Added to it are notions of a dying World Wide Web and an Internet mightier than ever. The rhetoric behind is that people today have switched their primary online activity from searching information on the open Web into "hanging out" on the semi-closed Internet (Anderson & Wolfe, 2010; Emery, 2010). These speculations being open to argument, the ever-changing nature and the changing power of mobile technologies are beyond question.

### **The Uptake of Ubiquitous Mobile Technologies Across Age**

Younger generations appear to be early adopters and constitute the primary market of ubiquitous mobile devices. According to Ipsos (2012), 46 percent of Canadian Internet population aged 18 to 34 are subscribed to smartphones. The same age group accounts for

one third of tablet users in the United States, and its younger cohort accounts for another 17 percent (OPA, 2012). Notably, a big chunk of these early adopters were born since 1980s into a world rich in technology. Being dubbed by some as “Millennial” or “Net Generation”, they are believed to possess multimedia enthusiasm, ICT efficacy, multitasking capability, and even cognitive styles that are distinctively different from older generations. (Tapscott, 1998; Howe & Strauss, 2000; Oblinger, 2003; Abram & Luther, 2004; Dede, 2005). As mobile technology increasingly gains importance, there is, as well, an assumption that nowadays young generations always plug into handheld mobile devices and stay connected to Internet (Prensky, 2008, as cited in Selwyn, 2009; Nikirk, 2012;). Although those beliefs and assumptions are challenged on many fronts, the portrayal of “Millennial” or “Net Generation”, to an extent, capture some characteristics of today’s mobile users on the youth side.

There are myths surrounding the technology adoption and use by generations preceding “Millennial”. Basically, these people witnessed the arrival of the digital age in their adulthood and had to develop digital literacy through years of learning. For those who have successfully acquired digital literacy, they are still believed to carry an “accent” in their technology use pattern. Research has identified relatively high levels of computer anxiety and technophobia in mature adults and especially seniors (Margaryan & Littlejohn, 2008; Hogan, 2009). The controversial digital divide discourse even believes in spotty or reluctant adult ICT use among the pre-1980 generations (Tufts, 2011), which seemingly suggest a likelihood that mature adults are non-users or late-adopters of “brand new” technologies such as ubiquitous mobile computing. Technology ownership statistics, however, negate this line of reasoning. As a nationwide survey tells the tale, middle age

Americans “experienced a notable uptick in smartphone penetration” with adoption rates reaching 54 percent among 35 to 44 years old, 44 percent among 45 to 54 years old, and 31 percent among 55 to 64 years old (Smith, 2012). The 65 and above senior group, despite their relatively small ownership in smartphones, is found to be one of the two fastest growing user groups on tablet market (ETC, 2012). According to these data, it needs further research to say that today’s adults, who are predominantly pre-1980 generations, are laggards in embracing the emerging mobile technologies.

## CHAPTER 2: LITERATURE REVIEW

### **Mobile Learning and Its Integration in Formal Education**

Mobile learning has so far no universally-agreed definition. For many it implies a device-assisted method of instructional delivery, a complement to in-class interaction, or “a portable process of teaching and study” (Kulkusa-Hulme & Traxler, 2005; Y. S. Wang, Wu, & H. Y. Wang, 2009; Kinash, 2011). M-learning in these senses co-evolves with mobile technology in school settings. Teaching activities from kindergarten through graduate studies are increasingly taking advantage of internet-enabled mobile platforms. Smartphones and tablets see their innovative uses by the student body in numerous ways: note taking, retrieving course materials, collecting data, word processing, creating multimedia content, developing e-portfolio, to name just a few (Bull & Reid, 2003; Hu, 2011; Young, 2011). On the faculty part, mobile devices serve multiple purposes such as taking attendance, researching, e-reading, and lecture planning (Young, 2011). The m-learning programs implemented across formal educational system are diverse, and much of them have started bearing fruits. Educational researchers are excited about the possibilities and affordances m-learning has to offer. Increasingly more funding is being made available to evaluate the educational impact of m-learning. For instance, Abilene Christine University, with its pioneering performance in m-learning research and experiment, gained a 1.87 million dollar support from AT&T, equipped all its undergraduate students with iPhone or iPod touch, and saw a regular use of ubiquitous mobile devices in 83 percent of its classroom transactions (ACU, 2010). Since 2013, such one to one deployment of mobile devices has been extended significantly through Apple’s Educational Purchase Programs, by which Abilene Christine University provides each faculty member with an iPad to

encourage their integration of mobile technology in the design and delivery of curriculum. (ACU, 2014).

### **Age-Related Concerns on Ubiquitous Mobile Technologies**

Ziefle and Bay (2008) took notice of the growing ubiquity of “small screen devices” with older adults joining the user base. They challenged the stereotypical digital divide thinking of older adults as less tech-savvy and less technically competent. According to them, age should be considered as “the carrier of individual characteristics” rather than the determinant of one’s attitude to and aptitude in technology use (p. 124). Ziefle and Bay’s examination of human-cellphone interaction patterns showed that “frequent usage and activities with the devices lead to a(n) elaborated knowledge that is basically benefiting performance for all age groups” (p.135). Compared to younger adults, mature adults and children had to deal with more anxiety and higher cognitive workload when exploring the functionalities of mobile devices. Hence, Ziefle and Bay proposed to engage these two groups in an “active and playful” interaction with mobile devices to enhance their self-efficacy in this regard.

F. Werner and K. Werner (2012) identified high rate of acceptance and satisfaction among elderly people towards ubiquitous mobile technology in *MyTablet*, a project that documented the tablet usage by a group of senior Austrians. Their findings suggested that compared with conventional PC, tablet was easier to use for elderly people thanks to its touchscreen technology embodying less functionality and less complexity. Among the elderly people’s top-used tablet functions, “brain training” (through games and riddles) ranked the first, and “information seeking” ranked the second. In another paper reporting the MyTablet project, F. Werner, K. Werner and Oberzaucher (2012) pointed out that “the



possibility to autonomously learn new features” significantly enhanced the elders’ confidence in mastering new technology (p. 183). The research concluded that smart tablet had a potential to reconcile the age-based digital use differences by helping the seniors transcend technical and socioeconomic barriers to new technology.

Seeing m-learning as the “follow-up” of e-learning, Y. S. Wang, Wu and H. Y. Wang (2009) undertook a study to investigate the possible impacts of age and gender on the m-learning behaviors. For its theoretic framework, the study adapted Venkatesh *et al.* (2003)’s UTAUT model to the m-learning reality. The findings indicated that performance expectancy, effort expectancy, social influence, perceived playfulness and self-management of learning were five determinants that had positive influence on an individual’s behavioral intention to undertake m-learning, which was valid for adults across age groups. However, compared with the youth, the over-30s were more likely to be motivated by social influence and effort expectancy towards m-learning adoption. The study suggested that in order to engage more mature adult learners, m-learning design should provide a user-friendly interface enabled by “touch screen, light pen data entry, handwriting recognition and even voice recognition mechanism” (p. 112).

In the CoCreat Project funded by EU’s Lifelong Learning, Romero and Barbera (2012) identified in tablet computer a potential for promoting collaborative learning and creativity amongst the elders. Throughout the project, a three-hour meeting was held biweekly, with learning materials and tasks assigned to the participants. Apple iPad was offered as a supportive technology for the learning process. The ergonomics of ubiquitous mobile technology such as iPad, as the research revealed, was highly appreciated by the elder people. The drag and drop facilities of the iPad navigation were favoured over the

keyboard and mouse operating system of PCs. While the CoCreat Project positively affirmed the effectiveness of iPad as a supportive technology, it also suggested that social interaction probably played a more significant role in helping the elders build up confidence, digital competence, and a sense of belonging to the learning community formed in the biweekly meetings.

### **Rationales for Integrating Mobile Learning, Adult Learning and Lifelong Learning**

As Kop (2007) points out, traditional views of knowledge that emphasize the pursuit of “truth” have given their way to constructivist philosophies that regard knowledge as fluid meanings constructed by ordinary people. Accordingly, learning has become less about the transfer of established knowledge and more about one’s active creation of new knowledge through social interaction. Adult educators and m-learning architects both embrace this epistemic shift, the former seeing their new role as facilitators and the latter identifying in mobile technologies a potential to promote “constructivist and collaborative approaches to learning, and flexible and adaptive approaches to teaching” (Kop & Bouchard, 2011; Manuguerra & Petocz, 2011, p. 61). Fundamentally, mobile devices are devised to connect social members by transcending temporal and spatial restrictions. They are held to enable the anywhere and anytime production, storage, consumption and exchange of content, thus blurring the demarcation between formal learning and informal learning (Traxler, 2010). Mobility and ubiquity being core ingredients in their conceptualization, mobile devices are also believed to inherently favor diverse adult learning patterns including discrete learning, situated learning, just-in-time learning, autonomous learning, and collaborative learning (Peng *et al.*, 2009; Sharples, 2006; Crescent & Lee, 2011; Peters, 2009; Park, 2011; Melhuish & Falloon, 2010).

M-learning has been informed by the lifelong learning discourse, as well. Literally, lifelong learning is “very ubiquitous” as it encompasses formal learning, non-formal learning, and informal learning across all ages (Thorpe, 2000). UNESCO’s Faure Report in 1972 and Delors Report in 1996 are two milestone literature of lifelong learning: the former articulates the urge for full and free expression of being human in a society increasingly dehumanized by technologies, and the latter builds on the former’s “learning to be” concept and juxtaposes it with “learning to do,” “learning to know” and “learning to live together” as four pillars of contemporary education. M-learning architects have readily embraced the lifelong learning philosophy. Sharples (2000) envisions a convergence between the “individualized, learner-centered, situated, collaborative, ubiquitous” lifelong learning and the “personal, user-centered, mobile, networked, ubiquitous, durable” handheld or wearable m-technologies (p. 179). Sharples *et al.* (2005) state that a prerequisite to valid theorization of m-learning is to recognize the occurrence of learning in lifelong and life wide scales. Naismith *et al.* (2004) identify in m-learning projects “six broad theory-based categories of activity,” namely behaviorist, constructivist, situated, collaborative, informal/lifelong, and support of learning and teaching. According to Naismith *et al.* (2004), the personal nature of mobile devices greatly favors informal and non-formal educational applications, and lifelong learning takes place as mobile technologies emancipate people from temporal, spatial and curricular limits.

### **Knowledge Gaps in Literature on M-Learning**

While growing attention is given to the theorization and implementation of m-learning, there are gaps to fill in the published literature. Sheer number of studies have focused on the integration of mobile technology into the educational initiatives targeting

the youngsters, whereas the m-learning effort made by mature adults is largely overlooked. In the narratives of digital divide theorists, mature adults take a secondary place to their younger cohort since the latter is regarded as rule maker and key player of the digital realm. Likewise, m-learning research pays much attention to the Millennial youth, who are current and future patrons of the educational enterprise. Only a few studies take into account the mature adults when addressing the educational aspect of mobile technology. The context of these studies is often limited to academic settings and rarely extends to other walks of life. Besides, attempts have been made to connect m-learning with constructivist and lifelong learning philosophies running through adult education, but little empirical evidence is put in place. In a word, educational research has so far insufficiently addressed the mature adults' use of ubiquitous mobile devices towards learning goals, and no systematic link is made between the m-learning discourse and the lifelong learning paradigm.

## **CHAPTER 3: PROBLEM STATEMENT & RESEARCH QUESTIONS**

### **Problem Statement**

As m-learning is essentially ubiquitous and durable, there is a need to examine its manifestation in lifelong and life-wide dimensions. This study explores the opportunities and challenges that ubiquitous mobile technology opens up for today's mature adults, most of whom are pre-1982 generations. It aims at establishing a meaningful link between the emerging m-learning trend and the learning context in the so-called post-PC era. Effort will be made to collect the adult learner's experience with tablets that embody today's mobile computing technology, as well as their perceived usefulness of this type of device. The result of literature review suggests that the engineering philosophies embedded in ubiquitous computing technology like tablets are highly compatible with the constructivist approach and lifelong learning philosophy running through adult education. Hence an overarching hypothesis is put forward that "effective use of ubiquitous devices such as tablets can positively influence the cognitive and social aspects of learning by mature adults".

### **Research Questions**

Briefly, the study sets out to answer the following questions:

1. Are there age-based differences between the young adults and the mature adults in their adoption and use of mobile computing technology?
2. How do mature adults make use of tablets and especially the tablet applications for learning purposes?

3. What are the major concerns among adult learners with regard to the educational utility of tablets? To be more exact, what are the obstacles, frustrations and difficulties that adult learners experience when using tablets for learning purposes?

## **CHAPTER 4: THEORETICAL FRAMEWORK**

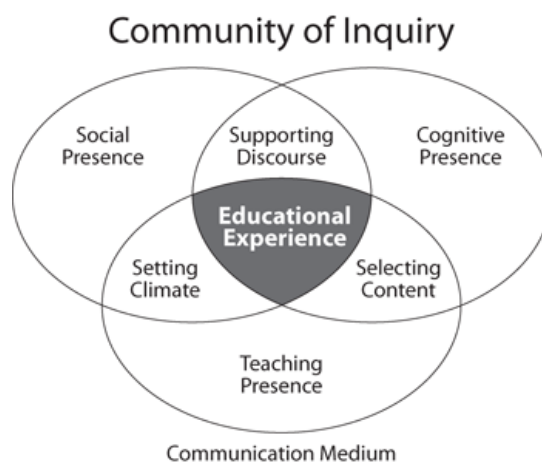
### **UNESCO (1996)'s Four Pillars of Education**

Delors Report 1996, officially known as "*Learning: The Treasure Within*," was a milestone literature published by UNESCO. It put forth "learning to know," "learning to do," "learning to be" and "learning to live together" as four pillars of contemporary education, which has been the key tone of the lifelong learning discourse. The concept "learning to know" implies the development of the abilities to concentrate, memorize and think critically. This pillar emphasizes on how people learn general and pure knowledge, acquire basic skills, and proceed with learning in effective manners. The second pillar "learning to do" promotes the acquisition of skills and competence in real life as well as their translation into all kinds of practice. In UNESCO's own narratives, "learning to do" is closely linked to vocational training and workplace performance. The third pillar "learning to be" mainly fosters personal development of autonomy, ethics, aesthetics, and physical and spiritual well-beings. It aims at promoting the all-round fulfillment of each and every person. Finally, the pillar "learning to live together" goes beyond the exploration of one's own being and reaches out for equality, justice and interdependence among social members. Specifically, it fosters awareness of similarities and differences, appreciation of diversity, empathy, respect and concern for others, and the mankind's will and ability to coexist, cooperate and thrive.

### **Community of Inquiry (COI)**

Garrison, Anderson and Archer (2000)'s Community of Inquiry theory views e-learning as collaborative-constructivist learning experiences by which a group of

individuals actively seek meaning for a cause through purposeful communication. A Community of Inquiry (COI) comes forth as the cognitive, social and teaching efforts made by e-learning participants become adequately visible. First, the participants project their “cognitive presence” by exhibiting their ability to meditate, communicate, construct, and finally confirm the meaning of a particular cause (Garrison, Anderson, & Archer, 2001). “Social presence” emerges when the participants foster their social ties by way of “projecting their individual personalities” and communicate with each other with trust, confidence and purpose. Finally, instructors, facilitators and learners who are coaching and tutoring one another are all able to project “teaching presence” when they are involved in designing, facilitating and directing the cognitive and social activities throughout the learning (Rourke, Anderson, Garrison, & Archer, 2001). Significant importance is attached to the technologic integration so as to enhance one’s teaching presence in a COI.



**Figure 1: The Community of Inquiry (COI) Model**

Reprinted from COI website by M. Koole, 2013. Retrieved April 18, 2014, from [https://coi.athabascau.ca/coi-model/coi\\_model\\_small/](https://coi.athabascau.ca/coi-model/coi_model_small/). Copyright COI website.



## **Framework for the Rational Analysis of Mobile Education (FRAME)**

Koole's (2006) FRAME model is conceived to examine the dynamics of m-learning in contemporary society, where an ever-growing amount of information is consumed, created and published by people, either individually or collectively, thanks to the mediation by technology. M-learning is portrayed in FRAME as the convergence of three primary aspects: mobile device (D), learner (L) and society (S). Device Usability (DL), Social Technology(DS) and Interacting Learning (LS) emerge when each two of the three main aspects intersect.

The first construct of FRAME, device (D), focuses on mobile devices and their physical, technical and functional characteristics. According to Koole (2006), the hardware and software engineering such as size, weight, power, storage capability, file transfer speed and the input and output capacities are all determinants of how the mobile device in question creates a sense of comfort, both physically and psychologically, in its users. Put differently, the first step towards effective m-learning is to bring up the accessibility, portability and usability of mobile device(s) to desired levels.

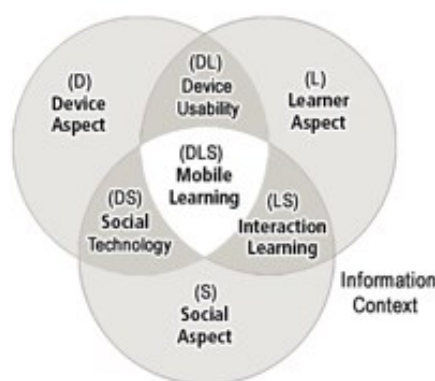
The learner (L) aspect involves how the learner encodes, retains and transfers information under the effect of their cognitive abilities, prior knowledge, memory capacity, emotions, values, and motivations. Koole (2006) emphasizes that m-learning should capitalize on the learner's actual and authentic life experiences. Knowledge discovery in m-learning should go beyond the knowing of static concepts and move towards the discovery of laws in practical settings. The learner in m-learning should be able to encounter information in multiple formats, retain them, and actively make use of them even if the context changes.

The social (S) aspect represents the m-learning participants' communication, interaction and cooperation for the purpose of exchanging, sharing and transmitting information. The integration into the m-learning community, as Koole cited Driscoll (2005), starts with the participant's sharing of his or her own "sign systems" and learning of those of the others (p. 32 ). Besides, the participant is expected to contribute to group communication with accurate, relevant and informative messages, or the conversation might become no longer constructive.

There are three secondary intersections inside FRAME. When the learner interacts with the mobile device(s), the Device Usability (DL) attributes, which include but not limited to the device's portability, intuitiveness, transparency, information accessibility, physical and psychological comfort, and user satisfaction, come to play an important role. Koole (2006) holds that these attributes add up to high mobility, low cognitive load and high task completion rates for the learner. When the learner interacts with content, instructor or other m-learning participants, the Interaction Learning (LS) intersection emerges, representing how the m-learning behavior is contextualized in and impacted by the cultures and circumstances that are unique to the m-learning community. Finally, the Social Technology (DS) intersection portrays how mobile devices, as equipped with SMS, WiFi, Bluetooth and social networking tools or apps, facilitate the information sharing and cooperation between various m-learning stakeholders.

The FRAME model completes its conceptualization of m-learning with the Mobile Learning (DLS) intersection in the center of the Venn diagram. The three-way relationship between mobile technology, human learning and social interaction finally culminates into "an enhanced cognitive environment" with information as "a shifting and growing frame of

reference” (Koole, 2009, p. 38). Herein, technology in general and mobile technology in particular are held to be active agents capable of mediating the learner’s anytime anywhere interaction with people, content, cognitive tool, and environment. By assessing the extent to which each section and each intersection are involved, the practitioners are able to gain a full angle view of the m-learning process as well as an insight into effective instructional design principles and practices in m-learning.



**Figure 2: The FRAME Model**

Reprinted from by “Framework for the Rational Analysis of Mobile Education (FRAME) Model: Revising the ABCs of Educational Practices,” by M. Koole and M. Ally, 2006. Retrieved from <http://auspace.athabascau.ca/bitstream/2149/612/1/01628461.pdf>.

### **Bridging the Gaps between COI, FRAME and Four Pillars of Education**

The link between COI and FRAME is self-evident: they are both Venn diagrams presenting an ideal integration between human learning and social interaction, as facilitated by instructors and mediated by mobile devices. More importantly, they inform not only researchers and also practitioners in the sense each of them proposes a robust framework of evaluation. As the focus of study shifts from e-learning to m-learning, FRAME makes more explicit the information context that we live in and work with. While COI holds

technology as an invisible vehicle for enhancing all kinds of “presences”, FRAME highlights mobile devices as an active agent in shaping the process of m-learning. In addition, FRAME continues to attach great importance to the meaning-making and knowledge construction process that is core to “cognitive presence,” so it highly values one’s sharing of his or her own “sign system,” which is consistent with the self-projection idea in COI’s “social presence.” FRAME is also successful in introducing many new ingredients to the conceptualization work and is more closely aligned with the m-learning realities. That being said, COI is always relevant and appropriate for studying the technology-mediated interactions between human, device, information and context. For example, the “teaching presence” in COI is somehow blurred in FRAME. As Koole suggests, it could simultaneously present in the “Interaction Learning” aspect and the “Social Learning” aspect. In addition, a COI survey instrument invented by Garrison, Cleveland-Innes and Fung (2004) and recently updated by Arbaugh *et al.* (2008) has been extensively used and proven effective in evaluating e-learning and m-learning courses and projects. A joint use of COI and FRAM is thus possible. The current study uses the strengths of COI and FRAM to formulate a framework that provides an in-depth focus on the m-learning behaviors of mature adults.

COI and FRAME, as far as they effectively capture the essence of e-learning and m-learning, have the potential to be used in measuring the level of technology integration in lifelong learning behaviors. The learner’s development of cognitive skills (learning to know), social skills (learning to live together), communication and problem-solving skills (learning to do) and self awareness (learning to be) is expected to take place when the “presences” emerge in COI and FRAME. The development of concrete indicators of the

role that ubiquitous computing technology plays in enhancing (or weakening) lifelong learning skills remains a challenge, which is beyond the scope of the current study. To date only two macro level studies, i.e. the European Lifelong Learning Indicators (ELLI) instrument developed by EU (2010) and the Composite Learning Index (CLI) instrument developed by Canadian Council on Learning (n.d.), have dealt with this issue. Studies on lifelong learning at micro levels, for example, those focused on personalized lifelong learning and lifelong learner, lend light to the current study and make it possible to partially address the cognitive and social aspects of Four Pillars of Education in mobile learning settings. Results from the current study will prove valuable for future micro and macro level research on this issue.

## **CHAPTER 5: METHODOLOGY**

In the context of this specific study, a qualitative methodology is employed to explore the lived experience and personal perspectives of adult learners in relation to their use of mobile technology in learning, either purposefully or accidentally. According to Tellis (1997), a qualitative inquiry must be built on three tenets: describing, understanding, and explaining. To be more exact, this approach to research starts with a goal to discover and understand a phenomenon from the perspectives of people who experience it, progresses with the collection of data in the format of words or texts, and finally culminates in comprehensive, holistic, and descriptive findings (Creswell, 1994; Merriam, 1998a; Hatch, 2002). Given that this study mainly seeks to understand how adult learners make sense and make use of ubiquitous mobile technology, the qualitative methodology is well suited in this case.

### **Instrument**

Interview is chosen as the major data collection instrument in this study, partially because that interview is a significant tradition of qualitative inquiry as well as an extensively used technique in social sciences like educational studies. The need for interview is also driven by the research questions stated earlier, which fit with Englander (2012)'s argument that the choice of research method should be based more on research interest or research problem rather than traditions or norms. Indeed, the conceptualization of the study originates from my research interest in adult learners' lived experience of mobile technology, which naturally calls into need a technique capable of probing further, digging deeper, and mining richer data than what a survey can do. The research questions

on how the adult learners perceive, evaluate, and potentially learn from their experience of mobile technology, which are distinctively different from the typical “how many” and “how much” questions asked in quantitative studies, also rationalize the adoption of an explorative and descriptive method like interview in this specific study.

To be exact, face-to-face semi-structured interview is determined to be appropriate for the purpose of the study. Compared with structured and unstructured interviews, semi-structured interview, which uses a list of not strictly sequenced questions, allows more room for due guidance from the researcher and free expression from the participants (Bernard, 2006a). In the context of the current study, the inclusion of questions in the interview is based on the needs to answer the research questions asked earlier. The first part of the interview collects demographic and personal data including gender, age, educational level, and employment status. The second part explores digital use characteristics, which is partly inspired by the quantitative study made by Teo (2013) and revolves around the themes including “comfort with mobile technology”, “comfort with multitasking”, “dependency on graphics”, “comfort with online socialization” and “expectation for instant gratification and reward”. Emphasis is placed on the third part of the interview, which is inspired by the COI and FRAME models and is meant to explore the utility or futility of ubiquitous mobile technology embodied by tablets in the context of lifelong learning. During this part, the interviewees are encouraged to reflect and comment on their experience of using tablets for the purposes of information consumption, production, sharing, and online socializing. They are invited to rate the level of ease to use tablets and the usefulness of tablet in formal and informal learning activities. They are asked about their overall concern, advices, and expectations regarding the use of mobile technology in

learning, as well.

### **Sampling**

Since this study works towards an insight into the mobile learning behaviors exhibited by adult learners, purposive sampling, which enables the selection of information-rich cases and the production of in-depth understanding (Patton, 2002), is favored over random sampling. In practice, following the approval of the study by University Human Research Ethics Committee (UHREC), the sampling immediately started from the social and academic circles that I am in. I asked people I know to recommend someone who might be interested in and appropriate for study. Documents such as Interview Protocol and Consent Form accompanied with an invitation letter to interview were either emailed or hand delivered to the potential participants. After I got a few confirmed participants, snowball sampling ensued to recruit additional participants.

### **Participants**

From early August to late October in 2014, altogether twelve person were interviewed face to face at various places such as university study rooms, a pizza store or the homes of either the interviewees or the interviewer. Table 1 provides an overview of the demographic and personal profile of the participants. Please note that pseudonym's have been allocated to the research participants to protect their identities.

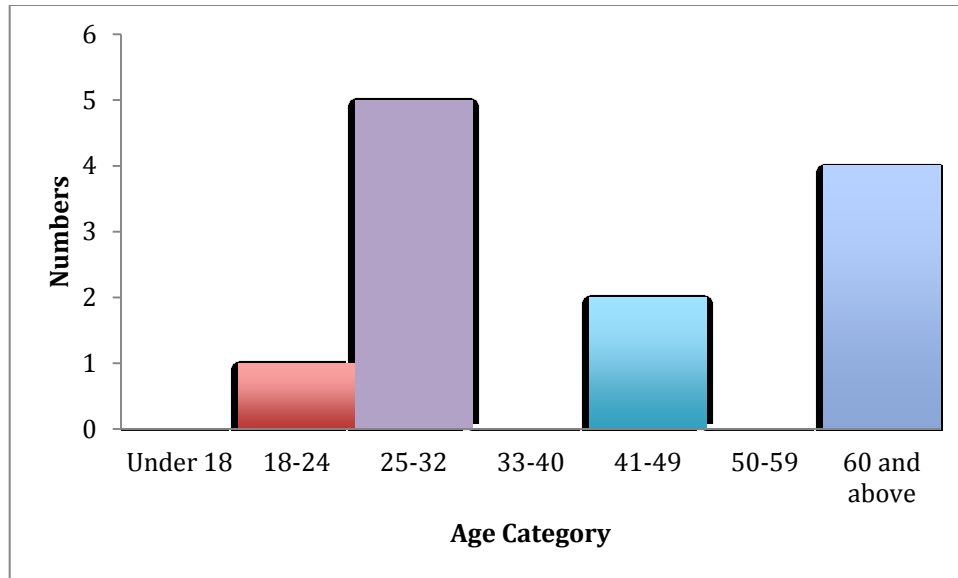
**Table 1: Overview of the “Tablet and Mobile Learning” Interview Participants**

| <b>Age Group</b> | <b>Name (Pseudonym)</b> | <b>Age Category</b> | <b>Gender</b> | <b>Employment Status</b> | <b>School Level</b> |
|------------------|-------------------------|---------------------|---------------|--------------------------|---------------------|
|                  | David                   | 25-32               | Male          | Student                  | Doctor's degree     |



|               |        |             |        |          |  |
|---------------|--------|-------------|--------|----------|--|
| Young Adults  | Evelyn | 25-32       | Female | Student  | Doctor's degree                                      |
|               | Julia  | 25-32       | Female | Employed | College  |
|               | John   | 25-32       | Male   | Student  | Took some university courses                         |
|               | Kim    | 18-24       | Male   | Student  | College  |
|               | Jeff   | 25-32       | Male   | Employed | Master's degree                                      |
| Mature Adults | Bob    | 41-49       | Male   | Employed | Master's degree                                      |
|               | Lisa   | 41-49       | Female | Employed | Bachelor's degree                                    |
|               | Kate   | 60 and over | Female | Retired  | High school diploma;<br>Took some university courses |
|               | Oliver | 60 and over | Male   | Retired  | College  |
|               | Peter  | 60 and over | Male   | Retired  | Bachelor's degree                                    |
|               | Sophia | 60 and over | Female | Retired  | Bachelor's degree                                    |

The age factor was prioritized during the purposeful sampling and recruitment, given the fact that the research is interested in probing the existence or non-existence of age-related differences in terms of mobile technology behaviors. There were six young adults aged between 18 to 32 and six mature adults aged 33 and over who eventually participated in the face-to-face interviews. Figure 3 gives a closer view of their age distribution:



**Figure 3: Age Distribution of the Interview Participants**

In addition to age, the dimensions such as gender, school level and employment status were taken into consideration, which allowed a certain level of sample diversity in the end. First, an equal gender distribution was ensured as the twelve participants included six men and six women. With regards to school level, seven participants hold a higher education diploma, two participants attended some university courses, and three participants have a college degree. Among the sample, there were four employed persons, four retired seniors, and four full time university students. As the interviews progressed, the participants' varied level of experience with conventional and emerging computing technologies also added depth and richness to the study.

### **Data Collection**

With the prior approval from the participants, all the interviews were audio recorded by using the *Voice Memo* feature on an iPhone and the *Voice Record* app on an iPad, which served as a backup for one another. Before each interview began, I briefed the participant with the research goal as well as his or her rights and entitlements, which were

also illustrated in detail in the Consent Form. The participants were then given time to read carefully the Consent Form, ask for clarification or confirmation, and consider whether they want to sign it or not. All these moments were audiotaped exactly as what happened. During some interviews, it happened that the participants needed to answer phone calls or doorbells or had to handle small unexpected incidents. Audio recordings were paused in such incidences until the interviews were resumed again. Overall, no recording malfunction occurred throughout the study, except that for unknown reason, the *Voice Memo* once failed to restart after an interviewee had come back in the conversation. The *Voice Record* on iPad resumed its work effectively, however, in this unexpected incident. After each interview, I transferred the associated audio file to my personal computer, assigned it with a special code, and stored it in digital format. Also, a copy of the audio file was stored in another personal computer of mine in case of loss or damage of the original file. Finally, all the audio recordings were transcribed verbatim, which constituted the major source of data for this specific study.

Bernard (2006b) proposed field jottings as a valuable addition to the data collected on the scene. While using the interview protocol printout as a guide at hand, I jotted down on the same paper a few keywords and phrases that the interviewees stressed with emphasis via tone of voice, nonverbal communication or repetition. As per Bernard (2006b), these jottings would “jog” my memory later to recall the important and relevant details that I had observed in the accomplished interviews. With a view to keeping the possible disturbance or distraction to a minimum, I didn’t make use of a notepad or a notebook for the jottings. For the same purpose, I scribed zero to a dozen of words and phrases in each interview, which seemed to be insignificant. The reading, processing and review of these jottings,

however, not only helped in way of recovering the dynamics of the interviews and also facilitated my coding and identification of emerging themes.

Schatzman and Strauss (1973)'s approach to structured field notes was employed to supplement and complement the data collected in the face-to-face semi-structured interviews. Considering data collection as an ongoing, progressive and cumulative process, Schatzman and Strauss (1973) advocated an approach to gather relevant data on all accounts, which typically involves the documentation of observational notes, theoretical notes, and methodological notes. Immediately after the conclusion of each interview, I used my laptop or tablet to write down what I heard and saw during the conversation, not only about the interviewee and also about the environmental factors. Basically, these notes recorded the process of interview in terms of Who, What, When, Where and How, and thus involved minimum personal interpretation, which was exactly what Schatzman and Strauss (1973) asked for observational notes. For theoretical notes, they were mainly about controlled and purposeful meaning making from the observational notes. I reviewed the observational notes about the interviewees' words and behaviors to locate the details that I personally deemed important enough, and then wrote down my initial interpretation of these details. Subsequent to the meaning making via theoretical notes for later retrieval and further elaboration, I reflected on the process of the interview in question as well as the research that had been completed so far, trying to keep track of the progress, shortcomings, and potential improvements of the research techniques used before, in and after the interview. All these reflections were phrased into methodological notes, which was the last, but not the least important part of Schatzman and Strauss (1973)'s three-layer structure of field notes.

## Data Analysis

The grounded theory approach and the content analysis approach are two of the most extensively used methods for analyzing text in social sciences. According to Bernard (2006a), the grounded theory mainly employs inductive or open coding to work towards “the discovery and labeling of concepts (variables) and the building of models”, whereas the content analysis relies more on deductive coding to test existing models or hypotheses (p. 493). Within the context of this study, a sole use of either inductive coding or deductive coding could not suffice for the research goals driven by not only exploratory questions and also slightly confirmatory ones. In other words, I as the researcher found myself in the exact situation as described by Bernard (2006a): “You have a general idea of what you’re after and you know what at least some of the big themes are, but you’re still in a discovery mode” (p. 494 ). Therefore, I typically followed Willms *et al.* (1990)’s as well as Miles and Huberman (1994)’s advice on switching and mediating between inductive coding and deductive coding, which means to start the coding job with some pre-constructed themes derived from literature review and then add emerging themes along the way of data analysis (as cited in Bernard, 2006a).

The ensued coding practice was characterized with a hybrid use of open codes, *a priori* codes, and *in vivo* codes. As stated earlier, the first part of the interview attempted to explore the existence or the non-existence of age-related differences in terms of digital use by the twelve participants. The questions asked therein were mainly inspired by Teo’s (2013) DNAS experiment, which had already generated from literature review and prior empirical studies a series of categorical concepts and associated properties. For the purpose of this study, those established concepts were slightly revised to focus on the mobile

technology use patterns exhibited by the sample. When it came to the data analysis, the pre-constructed units served mainly as *a priori* codes. While closely reading and re-reading each line of the transcribed text, I also heavily used the open coding technique to allow for concepts, categories and themes to emerge from the raw data. The employment of open codes was in line with the semi-structured nature of the accomplished interviews. It was best suited for exploring the answers to the second and third two research questions, as well. Finally, across the participants' own statements, there were a great many words and phrases with high degrees of qualitative richness and thematic relevance, each of which could be deemed a "good code" as per Boyatzis (1998). Hence *in vivo* coding, a technique that directly uses the informant's words as codes, was also extensively applied in the data analysis process.

During the subsequent stage, the coded data were reviewed as a whole, and an emphasis was placed on identifying any responses shared by all the units so as to build a broad profile of the adult mobile users. The analysis then moved on to determine if there are distinctive differences between the mature adult sample and the young adult sample in their mobile technology use behaviors. At this level, the data were reassembled according to the two age categories, and connections are made within and between the categories. Finally, the themes pertinent to tablet-assisted mobile learning were integrated to develop a richer and fuller portrait of mature adults as mobile learners.

Microsoft Word was chosen as the word processor for the ease of transcribing, data coding and analysis. The transcribed text was converted into a table with each row containing a chunk of text. The column to the right of the transcribed text was preserved for meaningful units at first-level coding, and two extra columns to the right of the coding

one were intended for categorical units or subthemes at the second-level coding and themes at the third-level coding. It should be noted, however, not all the identified themes were derived from codes and categories. There were independent themes that emerged, recurred, and finally stood out as recognizable patterns across the corpus of the transcribed text.

**Table 2: Example of Three-Level Coding**

| Text                       | Codes (Level 1)      | Categories (Level 2) | Themes (Level 3)                              |
|----------------------------|----------------------|----------------------|---|
| I: So I have iPhone, iPad. | Smartphone<br>Tablet | Device ownership     | Adoption or non-adoption of mobile technology |

### **Check for Researcher Bias**

A longstanding challenge to qualitative research has been the handling of “the researcher’s theories, beliefs, and perceptual ‘lens’”, which were summarized as “subjectivity of the researcher” by some but termed as “bias” by others (Maxwell, 2005, p. 108). To be more exact, the philosophical orientation, epistemological stance, methodological concern, and personal experience of the researcher all have an influence on the construction of reality and knowledge during the research (Arshad-Ayaz, 2006). Such challenge becomes stronger in this study, which is in itself a Master’s thesis work involving no co-investigator. Given the fact that the data were collected, coded and analyzed by one person only, due check for researcher bias is more than necessary.

Maxwell (2005) postulated that instead of making futile effort to eliminate the variances associated with subjectivity, qualitative research needed to focus on understanding how a particular researcher’s subjectivity influenced the conduct and the

conclusions of a particular study. Researchers were therefore encouraged to present their preconceptions at the very beginning. Likewise, Malterud (2001) claimed that preconceptions wouldn't grow into bias "unless the researcher fails to mention them" (p. 484). He went further by asserting that the researcher's declaration of his or her own preconceptions could aid the translation of personal issues to valuable sources of data in relevant studies. Johns, Torres, and Arminio (2013) proposed that making explicit one's own epistemological, theoretical and methodological groundings was one way of checking for possible bias. In practice, the studies conducted by Gustaffson (2007), Blom and Bronell (2008), and Blom and Pinzón (2009) exemplified how to perform such a check as those theses unexceptionally started with informing the reader of the researcher's common preconceptions, theoretical preconceptions and epistemological position. Given the thesis essence and the qualitative nature of this specific study, a brief but adequate account of my own preconceptions is deemed necessary and probably helpful in strengthening the reliability of the study.

My approach to the research on mobile learning by mature adults was influenced, in the first place, by the common preconceptions fostered through years of life experience and social interactions. I always consider myself as one of those early adopters and adept users of emerging technologies, although I belong to a non-Millennial generation. Two decades of experience with computing technologies, which ranged from the legacy MS-DOS based PCs to today's smart devices, has instilled in me sustained interest and confidence in technology use. An early part of my career was associated with electronic publishing of educational materials. I therefore had a high level of interaction with the technical specialists, the authors most of whom were university professors, and the end users



including both mature adults and young students. My personal belief is that computing technologies, except the highly professional ones, were devised for everyday use and could be learnt and used with ease by everybody for purposes including teaching and learning. This preconception was obtained through my first hand experiences, and I was acutely aware of it during the entire research process.

Being a graduate student majoring in Educational Studies with a concentration on Adult Education, I also had the opportunity to familiarize myself with the research topic via scholarly readings, discussions with colleagues, and lectures given by professors before undertaking this specific study. The description, interpretation and theorization of mobile learning by others lent to me knowledge and insight that turned out to have rather positive effects on the study. For instance, I consciously made effort to avoid any pitfalls associated with technological determinism when preparing the thesis proposal. Another example was the controversial digital divide theory. I read a lot of it, bought into it a little bit, and was informed of the different voices around it thanks to the discussions with my professors. While being fully conscious of my theoretical preconceptions towards the research topic, I deliberately didn't make them into concrete hypotheses so as to minimize the confirmatory flavor and accentuate the explorative essence of the study. After all, my overarching theoretical belief is that the core task of qualitative inquiry is about exploring, describing and understanding instead of authenticating or nullifying.

The epistemological position of the researcher also played a role from the design to the conduct and finally to the conclusion of this study. Epistemology, or the philosophy of knowledge, gives rise to one's beliefs about "the proper methods of acquiring and validating knowledge" (Rand, 1966, p. 36). I personally aligned myself with social

constructivism's view of knowledge as socially constructed and culturally mediated human product. It is through human's interaction with each other and their interaction with the environment that meaning is made and reality is constructed (Kim, 2001). This epistemological stance led me to COI and FRAME, the theoretical framework for this study, as the two models were based on social constructivism, as well. It also fostered in me a preconception that culture plays a critical role in shaping the way how social meaning and knowledge come into being. I therefore maintained a high level of sensitivity to culture related data, either consciously or subconsciously, during the data collection and analysis processes.

It was with the hope for keeping researcher bias at bay that I disclosed the common preconceptions, the theoretical preconceptions and the epistemological preconceptions I brought into this study. I also outlined how they were handled from the design of the study through the conclusion. While mixed effects were observed, caution was always exercised to minimize the possible harms associated with those preconceptions.

### **Limitations**

The study has a number of limitations in its current format. First of all, there is inadequate triangulation of the collected data. Given the brevity of the field jottings and the three-layer nature of the field notes, there was a relatively small volume of data that could be meaningfully compared and weighed against the findings in the interview transcripts. On another note, the single-observer research design requires a stronger check for researcher bias than the mere declaration of preconceptions. Even those conscious efforts to control preconceptions could by no means achieve the same level of objectivity as a teamwork performed by multiple researchers. Last but not the least, it is hard for the

current research to claim external reliability and generalizability due to its small sample size. There is always a need for a follow-up large-scale survey to determine whether age is a significant carrier of differences in mobile technology adoption, use and especially use for learning purposes. That being said, the current inquiry made no attempt to extend its findings about educational use of mobile technology to the entire mature adult population, since the breadth and the depth of mobile learning and lifelong learning are equally enormous. By making a link between how some mature adults make use of mobile technology and how informal learning and social interaction encourage each other, the current research aimed to inspire the discussion on the opportunities and challenges that ubiquitous mobile technology might open up to adult education as a field of study and practice.

## CHAPTER 5: FINDINGS

The semi-structured face-to-face interviews with twelve participants yielded a wealth of narratives and insights from both young adults and mature adults. Responses around the pre-constructed themes were obtained, and a handful of emerging and recurring themes were identified during the process of data analysis. The three research questions put forth earlier were addressed, to a certain extent, with qualitative evidence, albeit claiming very limited generalizability or transferability due to the research design itself. Such qualitative evidence were organized as follows: 1.) Description of and comparison between the two age groups' mobile technology using behaviors; 2.) Description of the mature adult participants' tablet using activities, especially those related to learning; 3.) Description of the mature adult participants' major concerns on the educational use of tablet. Summaries, exemplars, or excerpts of the participants' own accounts were incorporated as part of the qualitative data, aiming at a fuller and truer representation of their experiences, views and concerns.

### **Mobile Technology Using Behaviors and Age Concern**

This study began with an inquiry into the mobile technology using behaviors of mature adults and their younger cohort. The presence or absence of age-related differences was of core concern in the research question asked in the first place. Data analysis led to the identification of six themes in this regard, which were “adoption or non-adoption of mobile technology”, “comfort with mobile technology”, “dependency on graphics”, “comfort with multitasking”, “comfort with online socialization”, and “expectation for instant gratification and reward.” With the last five adapted from Teo (2013)'s DNAS instrument, these themes were deemed in this study as core attributes of one's mobile technology pattern, if there is one.

## **Narratives by the mature adult participants**

### *Bob*

Bob owns a tablet, a smartphone, and a laptop. The convenience associated with the mobility and Internet connectivity is the major advantage that Bob finds in his adoption of mobile devices.

Being an enthusiastic reader, Bob doesn't have a particular preference between reading on paper and e-reading, but does most of his reading on electronic devices. In his opinion, e-reading saves paper and saves time. He relies on laptop for text-heavy work, and conveniently uses pen and paper when doing calculations or scratches. Bob checks and answers his emails mostly on laptop, and the use of mobile devices for emails is a recently acquired habit for him.

Bob doesn't favor picture over words, nor vice versa. He cites IKEA's illustrated furniture manual as an example of pictures being more straightforward and easier to understand and follow than words in certain circumstances. When consuming news, he would like to see a fair combination of text and image.

Bob demonstrates high self-efficacy when multitasking in real world. "I think I am really good at it." But he has no experience of multitasking by using a mobile device.

Always favoring phone calls, Bob makes a rare use of texting and online communication software and apps. Still, he acknowledges that the video talking feature on mobile devices is helpful for him to keep connected with family members abroad. He expresses mixed feelings towards social media like Facebook or Tweeter. In his own words, "It's not 'I don't like'. Just say, I am not familiar with them, so (I don't use them)."

While giving account of his mobile use experience, Bob demonstrates a neutral attitude towards the immediacy or instant gratification enabled by today's mobile technology.

The use of mobile devices to receive emails, locate instant information or find directions, in his view, is time-efficient. He doesn't typically expect quick replies to his email, though, except "for some urgent issues". Nor does he abandon his reliance on the conventional website login method for emails, partially because he finds that email apps are faster but pose problems with properly displaying attachments in certain formats.

*Kate*

Kate owns a non-smart cellphone, a laptop, and shares a tablet with her husband. She considers cellphone as the most appropriate mobile device for her, since for most time, the laptop and the tablet "are fixed on their desks" and don't "move around". Nevertheless, Kate finds herself "not a big cellphone user" because of her heavy reliance on landline. According to her, cellphone is "not part of me. It is part of young people or people today." As for the tablet, Kate doesn't use it except when she is traveling.

Kate definitely prefers sources in print for reading. For example, she read news online occasionally, but always "like to read the newspaper as a newspaper, a paper." She uses tablet for brief news reading and online banking when traveling. Laptop is the only device that Kate uses for emails. She feels more comfortable with mechanical keyboard than with the touchscreen on mobile devices.

Although Kate reveals her fondness for pictures, she tends to employ more words than pictures to express or to explain. Video with commentary, according to her, is an ideal way to effectively convey the message in a news report. She feels negatively about smiley icons and emoji, finding them "too cute" and "too flippant".

Regarding multitasking, Kate prefers to do one thing at a time. She feels comfortable with going back and forth between four to five windows on the computer screen. She doesn't have the experience of multitasking on mobile devices.

Kate texts very little and always prefers phone call to texting or other means of communication. Texting, in her view, is "very short", "very abrupt", and "not something that comes naturally to me". In addition, Kate makes little use of online communication software or apps. She doesn't feel comfortable with video talking, in particular. She is not into social media such as Facebook, blogs, and Tweeter. The online communication and sharing activities of Kate are mainly restricted to her circle of family and friends, and she doesn't make friends with strangers online.

Kate has no specific comment on the immediacy brought by emerging mobile technology. Nor does she explicitly express a need for instant gratification. In her words, "I take a long time to get used to something new. But when I am used to it, I will embrace it." Indeed, she perceives herself as different from those who want to "get into it as quickly as possible."

#### *Lisa*

As the owner of a smartphone, a tablet, a laptop and a PC, Lisa is by all means an enthusiastic and satisfied user of emerging mobile technologies. She asserts her attachment to the smartphone and the tablet by saying: "I cannot live without them." Looking retrospectively, Lisa finds herself "not very excited like very young generation" during her first encounter with the tablet technology. But a friend who was already a tablet user told her that "it's very convenient, useful or something". She also took notice of the interest that her children had in the novel gadget. These two factors jointly led her into the purchase of a tablet.

Lisa prefers to use tablet for leisure reading but favors printed source for learning purposes. She rarely uses paper and pen in recent years. In her own words, “ I think I get used to the keyboard.” The auto correct and auto complete attributes of computing devices imply a time-saving and typo-free method for her. She uses her tablet to check and answer personal emails, but at the same time finds the touchscreen technology “okay” for emails but inadequate for heavy text.

In her daily life, Lisa takes pictures to record moments and shares them with friends via WeChat, a Chinese instant messaging app. She holds a positive view of smiley icon or emoji, believing “it can help you to express your feeling.” She uses a lot of smiley icons in her online communication. When trying to express herself or explain something, she uses pictures in addition to text and seeks a balanced representation of these two elements.

Speaking of multitasking, Lisa believes “it is really possible for me.” She gives examples of her multitasking in work and housework. However, when the multitasking involves a mobile device, Lisa believes that she could easily get lost. In that case, she needs to concentrate on one task, instead.

Lisa feels highly comfortable with online socialization on mobile devices, although she doesn’t make friends with strangers online for security reason. She uses WeChat everyday to connect with her Chinese friends. She also takes notice that her English speaking colleagues and friends are on Facebook, which, in her view, is more of a Western social media.

While speaking highly of the convenience that mobile technology brings about in terms of scheduling, connecting and retrieving information, Lisa doesn’t express a particular need for instant gratification related to her mobile use activities.



*Oliver*

Oliver owns a smartphone, a laptop, and shares a tablet with his wife. He used to be an early adopter and an adept user of technology before retirement. He expresses a fear of missing out when explaining his adoption of smartphone and tablet. In his own words,

And then we suddenly, we woke up to the cellphone of the smartphone. It's relatively new because we were suddenly saying, we missed from the plain old cellphone to the smartphone. There has been all to the tablet. There has been the tremendous change. And we missed that. So we'd better get going again. And that's basically the reason.

Oliver always favors "real paper" when reading. He also uses his laptop to read news at home, and uses his tablet for news and online banking on trips. He checks emails more often on the laptop than on the smartphone. For answering emails, he mostly relies on the laptop since he finds the touchscreen hard to type with. He therefore uses a stylus to go around and navigate on his mobile devices.

Oliver relies more on words than pictures when trying to express himself or explain something. He prefers video with commentary, when being asked about his favored way of doing a news report. Regarding the smiley icons and emoji, he dislikes them and finds them "fake".

As a person focusing on one thing at a time, Oliver believes that he does no multitasking. When using a computer, he tends to concentrate on a single task, too.

Oliver doesn't text at all. In his opinion, texting is a way that "destroys the language" as people use phonetic spellings or easy abbreviations in their messages. He cites the examples such as "u" for "you", "4" for "for", and "btw" for "by the way." He doesn't post on public space, but uses Skype weekly to communicate with friends and family members. He

feels comfortable with the video talking feature by explicitly saying “I love Skype. I love to see my friends.” He doesn’t add strangers as his online contacts, though.

The apparent urgency and immediacy imposed by mobile technology, in Oliver’s opinion, is unnecessary and sometimes detrimental to “real contact”. It happens often that he forgets to take along his cellphone. This doesn’t trouble him because he believes that having a landline with message system is “good enough.” While on trips, he uses the tablet to check emails without rushing to answer them. In fact, he identifies a disruptive power in emerging mobile technologies and exemplifies it with his own experience: in a dinner of friends who were all seniors, a hearing aid gave a low battery alarm, which was mistaken by many as a message or an incoming email, and consequently made them pull out the cellphones to check out. Oliver comments on this experience by saying,

I mean, they could have all left this thing within their pocket and say: “When I am home tonight, I am going to check out who tried to call me or who sent a message or whatever.” But people don’t do that anymore, you know, now.

*Peter*

Peter owns a smartphone, an iPod, a tablet, and a laptop. He describes himself as coming from a generation “used to the notion that if somebody wants a document, you got to send them a hardcopy, something printed on paper.” Increasingly, Peter realizes “that will not always be the case” and becomes determined to keep up with emerging technologies. In his words:

We keep up certain skills. And we develop new skills.... I don’t want to be one of those people that say: “Oh, I cannot do any of this stuff. That’s too complicated for me. I can’t try that.”

A big chunk of Peter's daily life activities has now been digitized: he has become comfortable and proficient with online shopping, has switched from real radio to Wi-Fi radio, listens to music in iTunes library instead of LPs or CDs, and is considering a change from cable TV to online TV.

Peter prefers paper when reading novels and books, but has shifted from the print to the tablet or the laptop when reading newspapers, magazines or articles. It is relatively recent that he uses a keyboard more than pen and pencil. Nowadays, the touchscreen on smartphone is his most frequently used method for inputting. He checks emails from the smartphone "every once in a while" and writes emails on it, too.

Between pictures and words, Peter has no specific preference. He describes himself as "visual in a sense" but "not specifically looking for pictures". He likes the smiley icons and emoji, although he has not used them in emails or texting so far. The main reason is that "I just haven't figured out how to do it."

Peter rates his ability to multitasking as better than he used to do. Specifically, he puts forth that the smartphone "sorts of gets in the way". As per his account, "like sometimes, it doesn't matter what you are doing, you want to look and see has someone sent you an email or has something happened."

Peter does texting but not a lot. He is on Facebook, but hadn't posted on it till the day before the interview. In his view, Facebook offers a means for people to stay connected. He speaks positively of the video talking apps such as Facetime, considering them to be superior to emails or mere phone. He doesn't feel comfortable about making friends with strangers online, and all his contacts on social media are people met in real life. Overall, Peter regards the online communication as "good" but "not perfect".

Peter takes notice of the extent to which mobile technology has changed the pace of modern life. As per his feeling, "... the pace of the TV is a little bit too slow. Well, as twenty years ago, I didn't find that." He expresses his concern that when things go "faster", they could also become "shallower." His critical thinking of the proliferating mobile technology is also based on his observation of some people being addicted and subjected to the immediacy and urgency posed by cell phones, instant messages or emails. His comments go as following,

What we used to do, if we had a phone, when you're out for a movie, and you come back to the house, and there is a voice of the phone message. Okay, that has to wait for three hours. So what? It's not that important. You know, it's just three hours.

*Sophia*

Sophia owns an e-reader, a tablet, and a laptop. She has rich experience with computing technology, which can be traced back to the use of punch cards and reader for computing in 1970s. Today's technology, as per her account, is way more user-friendly. Sophia received her tablet as a gift after trying her daughter's tablet and finding it "pretty cool." She doesn't want to own a smartphone for multiple reasons. First, she believes that tablet and smartphone are "the same." Second, she doesn't feel the need to be accessible anywhere anytime. Last, she finds the fee for smart plan is "too much." The combined use of a landline, a tablet, an e-reader and a laptop, as per Sophia, suffices all the technological needs in everyday life.

Reading on paper and reading on device, in Sophia's view, each has its own strengths and limits. She praises the portability and the self-illuminated screens of e-readers, but always enjoys the feeling on real paper when reading books. Sophia likes to write with pen and paper as she is used to them. When it comes to spreadsheets and accounting, she mainly employs the keyboard on laptop for inputting. She also uses a stylus when typing and making drawings on

her tablet. She expresses her favor on the touchscreen technology, finding it “faster” and “easier” than the keyboard. Another advantage of the touchscreen, according to Sophia, is its access to multilingual panels, which is way more convenient than the different layout settings for languages on mechanical keyboards. Sophia uses the tablet to check emails and answer them “right away”, which, again, is identified as “faster” and “easier” than the laptop.

Sophia is fond of pictures, but exhibits no dependency on graphics or words. She “can use either one.” When trying to express or explain, she “is okay with just words.” She finds that smiley icons and emojis are “fun”, and makes use of them when writing to her grandchildren and friends.

Speaking of multitasking, Sophia is confident by saying “I can do more than one thing.” Music or radio doesn’t constitute distraction for her. She cites the example of handling four to five tasks simultaneously at housework. She feels comfortable with multitasking using mobile technology. For instance, she is able to talk on phone while using her tablet, and she is also able to perform web search while checking email.

Nowadays Sophia has substituted most phone call communication with emails. In her own words, “ I hardly use telephone anymore. Everything is on email.” She describes Facetime as “fun” and “good”, and uses it only with family members. She doesn’t feel comfortable with making friends with strangers online for security concern.

Sophia embraces mobile technology with sustaining patience and critical reflection, albeit the fact that the words “easier” and “faster” are repeated many times in her account. She is satisfied with recorded messages on landline, learns arts with patience by playing and replaying online videos, and doesn’t typically expect instant results. Equally mentionable is Sophia’s critic of the modern society’s dependency on technology. She feels that tablet,

smartphone and devices alike could be “overused”, which possibly leads to unproductive and even “antisocial” behaviors among the youth.

### *Recap of the narratives*

The accounts by the mature adult participants are more about their technology adoption and much less about non-adoption. Most of them have years of experience with technology, which ranges from the use of the programming language Fortran in 1970s or the utilization of the first mass-produced Apple computer AppleII in mid-1980s through a more or less digitalized lifestyle in the twenty-first century. Some mature adult participants came to accept and use emerging mobile technologies under social influence. For instance, Oliver’s wife talked him into buying a smartphone by saying: “You’d better get a thing that you can text on.” Likewise, Sophia and Linda took interest in the tablet technology as being influenced by a family member or a friend. In addition to social factors, the fear of missing out on important happenings is identified in a couple of narratives. Such concern didn’t necessarily factor into the mobile technology using behaviors of these participants, nevertheless, as they show lower than moderate dependency on technology and express little anxiety when being disconnected from the Internet. Finally, perceived utility and perceived ease to use also play a role in the decisions of adoption or non-adoption by some mature adult participants. For example, Sophia’s perception of tablet and smartphone as two functionally overlapping devices, to a certain extent, holds her back from the adoption of the latter.

A moderate level of comfort with emerging mobile technology is observed in the six mature adult participants. When being asked about their preferred method for reading, the responses are close to neutral or leaned towards “real paper”. This doesn’t change the fact that they all read on electronic devices, especially for small text readings such as news, articles, or

emails. Not all of them favor the same method of inputting. While pen and paper are decreasingly used, keyboard on laptop or computer remains the most often used instrument for text-heavy input or serious documentation work. Touchscreen on mobile devices, sometimes used together with a stylus, is found by many to be convenient enough for emails and brief notes. While there are a couple of mature adult participants who explicitly favor the touchscreen technology over anything else, some of their cohorts still insist on using laptop or computer to input everything including emails.

Nil to little dependency on graphics is identified across the narratives given by the mature adult participants, albeit their varied attitudes towards the smiley icons or emoticon. Most participants acknowledge the communicating power of pictures but prefer a combined use of pictures and words when expressing themselves or explain something. Emphasis is usually placed on words, and pictures are mainly considered as auxiliary or supplementary. The participants exhibit mixed feelings towards smiley icons and emoji, the pictorial characters that are heavily used by today's people in online communication and text messages. Half of the six mature adults accept these pictorial characters, describing them as either helpful or fun. In contrast, two mature adults show disinterest or even dislike in smiley icons, finding them unnatural and fake.

The participants give varied responses when being asked to evaluate their ability to multitasking. Four of them exhibit moderate to high confidence in handling more than one task at work or housework, whereas the rest two define themselves as people focusing on only one thing at a time. The role of mobile technology in multitasking is somehow insignificant in these mature adults, since there is only one participant who confirms her feeling of comfort when using mobile devices to handle multiple tasks. Noticeably, a participant even puts forth

that mobile technology like smartphone could be a deterrent instead of a facilitator if its user engages in multiple tasks.

The accounts of online socialization activities display both similarities and differences. None of the six mature adults is an enthusiastic texter, and only one of them is a regular user of instant messaging apps. Phone call remains the most favored means of communication for three participants. While these people make a noticeably low use of texting, their participation in voice talking and video talking online ranges from minimum to moderate, as well. There is one participant who predominantly uses emails over other means of communication. Half of the participants are non-users of social media. The social media users differ from each other in the extent to which they are active in the virtual communities. One characteristic shared by all the participants is that they don't make friends with strangers online, and their online sharing and socializing activities don't go beyond the circle of family and friends in real life.

The embracement of mobile technology doesn't drain patience and produce a demand for instant gratification in the mature adult participants. While appreciating the convenience and time efficiency associated with mobile devices, these mature adults express their concern and critical thought regarding the rapid paced technology. To avoid the disruptive and detrimental consequences posed by hyper-connectivity, these mature adults make a selective and rationalized use of mobile technology. One of them even goes further by stating that "I am almost intentionally not wanting to use it (i.e. smartphone) for that (i.e. searching instant answers)."



## **Narratives by the young adult participants**

*David*

David owns a laptop and a tablet. His first encounter with tablet was back in his homeland, when a friend of a friend gave a presentation about a newly acquired iPad. As per David's first impression, tablet was "cool" but "expensive." Gradually, he saw more and more people using tablet for reading, listening to music or watching movies. "You become interested to have this thing." He finally purchased one after Samsung released Galaxy Tab. Being an adopter of the tablet technology, David is at the same time a none-user of cellphone. Back in his homeland, David used cellphone for everyday communication. In Canada, he feels no need for cellphone since "whether school or home, Internet is there." He finds his cellphone-free lifestyle saves time and money. In his words: "it is not always I want to get in touch with people." He also suggests the fee associated with smartphone as a cause of his non-use of this specific device. Equally mentionable is David's comments on the tablet owning ratio that varies across countries and continents, by which he identifies price as a barrier for many to take up emerging technologies.

David favors reading on paper over e-reading because the former is less eye straining and easier for taking notes and making references. He also acknowledges that e-books are superior to real books in terms of weight and portability. Tablet is his most favored device for reading electronically. Generally, David prefers typing to handwriting since the former is neat and "saves space". He takes notes by hand, but employs keyboard for reports, assignments, or academic projects. He has negative feeling about the touchscreen technology, which is mostly because of the small screen size and the relatively high typo rate. David checks emails on his tablet, but always prefers to use his laptop for sending emails. In his words,

Even if I sent email on my tablet, when I get to my laptop, I feel that I didn't send it. I have to check and send it (from the laptop)... I don't believe it (*i.e., the tablet*).... So I trust the laptop more than that (*i.e., the tablet*).

When being asked about the preference between pictures and words, David expresses his specific favor on videos. He makes use of videos when trying to express or explain. He postulates that sometimes pictures are culture sensitive, but videos, on the contrary, are universal. He occasionally use smiley icons and emoji in his emails, believing "it makes the conversation better."

David can handle up to three tasks at a time, but at the same time he describes himself as "not efficient" while multitasking. When using a mobile device, he can easily switch between the tasks such as email, text message, and reading, with music on in the background.

The online socialization of David mainly comprises of emails and social media. He is moderately active in Facebook and posts on it mostly from his laptop. Email has risen up to be David's most frequently employed means of communication these days. In his opinion, conversation is more focused in email than in phone call. In addition to do emails online, David uses a free text app on tablet and a landline. Video talking is out of the question since the pertinent apps usually require a mobile phone number for identity verification. David uses the landline or the tablet to contact with strangers before meeting them in person, which is partially for safety concern. Overall, David always favor face-to-face communication to online socialization. He also takes notice that different culture prefers different means of communication. In his experience, Koreans don't like emails, and Canadians prefer conversation in real world.

David doesn't typically expect instant gratification or reward in his online activities. He believes that technology gets people quicker to information and knowledge. He cites the example of online book previews, which enable the reader to quickly access information that is more up to date or otherwise hard to locate. He also feels rewarded when a follower presses the "like" button below his Facebook post, but is skeptical about the feedback given by "committed followers". In his own words,

But some people click "like" without reading. That's what I don't like. Sometimes I wrote something, within a second, someone "like" it. I said: "Aha! It can't be. They didn't really read".... It gives good feeling when someone "like". But I know the most important is what I wrote. So sometimes even the person, people don't really like, yeah, I feel it works if I [pause] This is what my view. I didn't mind people "like" (*or not*).

*Evelyn*

Evelyn has a smartphone, a PC, a laptop and a tablet. Her initial impression on the tablet technology is something "new", "very convenient" and "easy to use." She took interest in this mobile device on her first encounter with it. She now utilizes her tablet mainly for the purposes of travelling, scheduling, and doing Skype.

Evelyn prefers to read in print, but also reads on PC so as to save paper. She doesn't read on mobile devices, though. For inputting, her most preferred method of inputting is pen and paper, and then mechanical keyboard, and then the least favored touchscreen on mobile devices. She checks emails on PC, laptop and mobile devices, with PC being the most frequently used one. Also, she answers 90% of her emails on PC.

Evelyn prefers pictures to words, and uses a lot of images when expressing herself. She doesn't make use of smiley icons and emoji and thus has no comment on them. She prefers to consume news in the format of video "because it's faster to know the information."

Evelyn is comfortable with multitasking and is able to handle three to four tasks simultaneously. Music constitutes no distraction to her. Rather, it helps her to concentrate.

Evelyn feels comfortable with online socialization via mobile technology. She does Skype on tablet to interact with her friends. She is on Facebook, checking news on it everyday but posting only twice or three times a month. She doesn't text a lot, and always finds phone call to be more effective and more time-efficient than texting and emails.

Citing the Google Maps app as an example, Evelyn puts forth that mobile technology helps her save a lot time. She doesn't typically expect quick reply to emails, and would be fine with a two to four day's waiting. For urgent matters, she would rather use phone calls.

*Kim*

As the owner of a smartphone, an iPod, a laptop and a PC, Kim expresses his interest in owning a tablet, believing that it would be "beneficiary" and "easier" than the smartphone, especially for the purpose of note taking in his study. In his own words, "For me the phone is mostly for hanging around.... Because I think tablet is way better for learning than the mobile phone."

Kim prefers reading on paper because it implies more convenience for note taking as well as a more involved reading experience. He also finds that e-reading has its strengths such as being easier to access and being easier to keep track of the reading progress. He prefers handwriting when taking notes from printed sources, but favors keyboard when taking notes from teachers. He uses keyboard for text-heavy input due to his perceived ease to revise and edit on computer as well as his concern on hand strain. He uses his smartphone to check emails on the go, and uses computer to check emails at home. He prefers to write emails on

the computer because “I feel more confident about my grammar in front of the computer actually.”

Between pictures and words, Kim views himself as “more for pictures.” He includes smiley icons and emoji in text messages and emails because “it’s fun.” When doing a presentation, Kim prefers a combination of pictures and words, with emphasis placed on words, though.

Kim rates his ability to multitasking as “below average”, since he has to “focus on one thing till really it is done.” He believes music gives him “that boost of energy and that drive” when he is into a task, though he doesn’t consider music as part of multitasking. Also, he has the experience of chatting online and texting at the same time, but doesn’t consider such experience as multitasking, neither.

Compared with online socialization, Kim prefers meeting with people physically so as not to miss the body language, the facial expression, and so on. Offline communication accounts for the majority of his everyday communication, with texting being the most frequently used method. Still, Kim is an active user of social media like Facebook, Youtube, and Tumblr. He just started to post photos on Tumblr from his computer. Kim uses the instant messaging software Skype on his computer, mainly for learning purposes such as discussing a group project with his team members. He also uses the WeChat app on his smartphone to connect with his Chinese families and friends. He holds a reserved acceptance of the instant messaging apps that are devised for making random friends, and doesn’t use mobile technology to socialize with strangers.

Belonging to the youngest Millennial generation, Kim feels the pull of the fast-paced technologies and simultaneously handles things at his own pace. He checks emails once every

two or three days. Most of his social media activities take place on his computer but not mobile devices. He adheres to camera for photographing and uses his smartphone only for some quick pictures. When explaining his perceived usefulness of tablet for learning purposes, Kim states that “because like it (*i.e. the tablet*) is faster. When it’s faster, you can learn more things.” This statement, along with statements alike in his account, conveys Kim’s expectation for efficiency but not for instant gratification.

*Jeff*

Jeff owns a smartphone, a tablet, a laptop and a PC. When getting to know the device tablet for the first time, he took it as something “between smartphone and laptop” and “not useful.” Later, he witnessed an increasing use of tablet among his friends, and “got a chance to use it and play with it.” It was this experience that sparked his interest in having his own tablet.

Since his purchase of smartphone, Jeff has switched from printed sources to this mobile device for most reading. In his words, “it (*i.e. the smartphone*) is very small, easy to carry, and I can read everywhere.” Eye strain is his major concern regarding e-reading. Jeff has been used to keyboard typing since university studies, and seldom uses pen and paper nowadays. Although he feels rather comfortable with the touchscreen technology, he always prefers keyboard on laptop for text-heavy input. Smartphone is Jeff’s everyday device for emails, both incoming and outgoing. When it is necessary to write a long email, Jeff resorts to the computer, which, according to him, happens no more than twice a month.

Jeff is fond of “funny pictures” and shares them with friends via emails and text messages. He also uses a lot of smiley icons and emoji in his messages, finding them bringing

people closer and “better than words.” Video is his preferred format for news as it is “direct” and “clear”.

Jeff rates his ability to multitasking as “at least strong”, and gives examples of him multitasking on computer at his work. He is able to handle up to five tasks at a time. He also feels comfortable with multitasking on mobile devices, being able to chat online, search information, and send data simultaneously.

Nowadays, 80 percent of Jeff’s social networking is conducted via mobile technology. He finds online communication has only minor differences from face-to-face communication. The video talking apps like Facetime, in particular, is perceived by Jeff as exceptionally good in conveying not only voices and also nonverbal messages. He uses Skype at work. Facebook, WeChat, and Instagram are the three social media that Jeff subscribes to on his mobile devices. According to him, Facebook is more about connecting with “local friends”, and WeChat is used on daily basis to interact with his Chinese friends. He doesn’t use the instant messaging apps that are devised to find random friends, though.

Across Jeff’s account, there are positive comments on the effectiveness and efficiency brought by mobile technology but no pronounced longing for instant gratification. For example, he finds the GPS app is “quicker” than the GPS device “because you have to connect the device with your car.” He also expresses his satisfaction with the push notification feature of smartphone, which enables him to access unread emails “as soon as possible.” Always looking forward to an instant access to new messages, Jeff is fine with waiting for others to respond him, nevertheless.

*John*

John owns a smartphone, an iPod, and a laptop. He expresses interest in owning a tablet because “it’s not small not big.” He expects that tablet with an external keyboard could replace his laptop to some extent. According to him, “(*Touchscreen is*) hard to type. I don’t like it. But once the kind of tablet has a keyboard, I think I don’t have any reason, I don’t have any reason to not use it.”

John prefers to read on paper, and reading on devices is like “the wrong type” for him. He favors pen and paper over keyboard input. He occasionally uses the Scribble app on smartphone to take brief notes. The use of smartphone for emails is recent for John since he just got his data plan. If there is something urgent and if laptop is unavailable, John would use his smartphone to send an email. According to him, the major weakness of the smartphone is its small sized screen, which significantly lowers the operability of the touchscreen. In contrast, the keyboard on laptop is “so convenient” to type with.

Compared with pictures, words are more of John’s favorite. He holds a balanced view by saying that pictures sometimes has more power than mere words, but words allow for more imagination than pictures. He doesn’t typically employ graphics when expressing himself. He uses smiley icons and emoji when occasionally texting to “younger ones”. Indeed, he perceives those picture characters as a language of the youth.

John describes himself as “unlikely to multitask” since he tends to concentrate on one thing at a time. He doesn’t have experience with multitasking using mobile devices.

With regards to online socialization, John’s position is “I really prefer to meet physically with people, but not with the cellphone (*or device*). I just contact with my friends, but not strangers.” His smartphone is mainly used as a phone for calling and texting. In



addition, he has Facebook installed on his phone and posts on it twice a year. He uses a Korean instant messaging app Kakao to stay connected with his friends in homeland. For other kinds of online communication like Skype, he primarily uses his laptop.

John finds that mobile technology helps save time in the way of finding information. At the same time he speaks positively of the auto login feature of smartphone apps such as Facebook. In his words, “Because it’s ready to show it, right? You don’t need to type something. You can just browse it.” Except this, he doesn’t express concrete interest in nor need for the ease, immediacy and instant gratification entailed by emerging technologies.

### *Julia*

Julia owns a smartphone, a tablet and a laptop. She uses the word “excited” to describe her feeling when getting to know the tablet technology for the first time. She identifies tablet as very easy to use from the beginning through now, but doesn’t go to detail about how she adopts this specific technology.

Julia prefers to read books and novels in print, but likes to access information in electronic format so as to save paper. For her, e-reading doesn’t imply physical discomfort. Nor does it have significant differences from reading on paper, which is owing to today’s apps’ powerful editing and annotating features. She sticks to paper and pen in note taking, but prefers electronic format for other items because electronic files are easier to store and retrieve. She prefers to check emails via apps, finding them more accessible and more straightforward than the account login webpages. She types long emails on mechanical keyboard and writes short emails on smartphone. In her words,

If I have to write like, you know, a very long email, I’ll do it by computer. But even if it’s important and it’s like three lines, but it’s very important, I’ll do it on my phone. I don’t feel like it’s not going to get there, you know.

One reason of Julia's adherence to paper and pen for note taking is that "I don't take linear notes. I like to make arrows." She uses illustrations when trying to express herself or explain something. She is also visual in the sense that on a trip, she would rather show her friends pictures than telling them how it was. Despite her expressed love for pictures, Julia is not fond of smiley icons and emoji.

Julia rates her own ability of multitasking as medium. She is able to handle up to three tasks at a time. She is also comfortable with using more than one app simultaneously on mobile devices.

Online socialization constitutes a significant part of Julia's daily life, although she always prefers face-to-face communication as a more comprehensive experience. She uses on her mobile devices the instant messaging apps such as Kakao, WeChat, Voxer and Viber to interact with her friends from diverse cultural backgrounds. She is on the photo sharing and social networking platform Instagram, not posting a lot, though. Her contacts online are unexceptionally people she knows in real life.

Like her cohort participants, Julia doesn't specifically expect instant gratification while acknowledging the role of ubiquitous computing technology in delivering accessibility, convenience and efficiency. She doesn't typically look forward to a quick reply when sending out an email. Nor does she find it annoying that apps need updates from time to time. One thing troubles Julia now is that her smartphone, which has been installed with too many apps, starts to get slow. In her own words, "because you are like waiting, like waiting for the thing to open. Like if you need to look for something quickly, like you have to wait. So that's frustrating." This testimony, however, is more of a concern on device memory than an adequate evidence of loss of patience and need for instant satisfaction.

### *Recap of the narratives*

Not all the six young adult participants have the same technology adoption habits. While social influence, perceived ease of use and expected utility led some of them to the adoption or planned adoption of a certain mobile technology, economic or technical concerns occasionally hold some of them back. Before making their purchases, three out of the four tablet users in the sample were influenced by those already users of tablet, who were either friends or casual acquaintances. Expected utility is a repeated theme when the two potential users of tablet express their pre-adoption beliefs. Touchscreen as an inadequate inputting technology, which is mentioned in all the narratives, is cited by one potential user as a reason for his non-adoption of tablet for the moment. Technical concern also factors into the non-use of smartphone by a participant who finds pervasive access to Internet in this country. Finally, the affordability of emerging mobile devices such as tablet is suggested as a possible barrier to technology adoption at both personal and societal levels.

The Millennial sample overall demonstrates a medium level of comfort when interacting with mobile technology. With only one exception, they are unanimously attached to the conventional method of reading and view e-reading as supplementary and auxiliary to reading on paper. A hybrid use of handwriting, keyboard and touchscreen is observed in most participants' accounts of inputting behaviors. Notes are often taken by hand. Touchscreen on mobile device is conveniently used for instant messages, memos, short emails, and sometimes brief notes. Mechanical keyboard on laptop or computer remains the major tool for heavy-text input. The utilization of apps to check email is a habit shared by all the participants, albeit to varied degrees. When it comes to the use of mobile devices for outgoing emails, the narratives reveal disparate and even opposing attitudes. Those who prefer to use laptop for sending

emails, as represented by David and Kim, appear to trust their laptop or computer more than their mobile devices. On the contrary, those who use mobile devices for most outgoing emails, as exemplified by Jeff and Julia, tend to select the input method mainly based on the length of the message.

Five of these six younger participants can be described as visual, showing a moderate to high dependency on graphics in their communication patterns. First of all, online sharing of pictures is common in this sample, which includes the only one participant who favors words over pictures. Additionally, when trying to express themselves or explain something, most younger participants would avail themselves of visual elements such as illustrations, pictures, and videos. Lastly, this sample manifests an uneven attitude towards the visual symbols in electronic format. Three of them hold a positive view of smiley icons and emoji, in addition to one participant who relates these pictorial characters to the younger generations. The other two participants, in contrast, make no use of smiley icons and emoji in texting and online communication.

The self-perceived multitasking ability of the Millennial sample varies from “below average” to “at least strong”. To be more exact, two participants tend to focus on a single task at a time, another two participants are able to handle up to three tasks simultaneously, and the rest two are capable of more than three concurrent tasks. The possibility of multitasking by using mobile devices differs from one participant to another, as well. Noticeably, Kim’s account calls into question which genre of task is eligible to be counted as part of multitasking. In his opinion, listening to music is something that doesn’t really require effort. As for online chatting and texting, each of them can be regarded as no more than “a small task”.

Between online socialization and real-world personal contacts, four of the six Millennial participants explicitly prefer the latter. Communication online, nevertheless, takes a considerable share of the everyday routines of the sample. Five participants are on Facebook, albeit the fact that most of them don't post much. Two participants use the photo sharing app Instagram, and one participant posts on the photo blog Tumblr. Among the instant messaging apps used by the Millennial sample, there are recently developed mobile apps such as SnapChat, WeChat, Kakao, Voxer, Viber, and there is always a place for Skype, which has been around for more than a decade and which now has both desktop version and mobile version. It is mentionable that the apps such as WeChat and Kakao are culture specific. The adoption of an instant messaging app or a social media, therefore, is sometimes linked to one's ethno-cultural background. For example, Jeff interacts with his Chinese friends via WeChat and connects with his Western friends on Facebook. In his words, "...if there is an app to chat with your friend, but the other friends don't use it. And why you use this app? So you have to use what most friends use, the apps." Finally, the online communication and socialization by the Millennial sample is largely limited to the circle of families, friends and acquaintances, except David's occasional use of Internet to talk to strangers before meeting them in real world.

Within the context of this study, there is no concrete evidence substantiating the need for instant gratification in the Millennial mobile users. While consuming instant information from online, the Millennial participants stills take time and patience to read real books, write posts with substances, or wait up to a few days for responses from other people. While facing up to multiple tasks, their concern on quality of work usually overrides their pursuit of time efficiency. The online activities undertaken by them are dictated mostly by their practical

needs and technical concerns. They don't feel really rewarded by simply having more followers on Facebook or receiving a positive comment from an indiscriminating reader. Therefore, it is fair to conclude that these young adult participants are not spoiled by nor become subject to today's fast-paced ever-changing technologies.

### **Existence or non-existence of age-based differences**

#### *Adoption of mobile technology*

Though the use and non-use of a mobile technology is more of a personal decision and less of a collective pattern, this study identifies some shared and varied characteristics in the adoption behaviors of the two age groups. First, laptop, smartphone and tablet rank the top three popular devices adopted by both groups. The laptop adoption rate is 100% across the sample. The tablet adoption rate in the younger sample is 66.67%, which is lower than the 100% in the mature adult group. The smartphone adoption rate in the younger sample is 83.33%, which is higher than the 66.67% in the older sample. Secondly, social influence, perceived ease of use and perceived utility are identified as major factors luring both the Millennial participants and their older cohorts into the adoption or planned adoption of mobile technology. The fear of missing out, however, is pronounced in the narratives of some mature adult participants but largely absent in the accounts given by younger ones. Last but not the least, both age groups express their concerns on price or technical issues, which hold back some participants from adopting a specific device like smartphone or tablet. That being said, compared with the younger ones, the mature adult group is more content with their already adopted mobile technologies and expresses less need for upgrading or changes.

### *Comfort with mobile technology*

Contrary to stereotypical thinking, the Millennial sample and the pre-Millennial sample in this study show no significant difference in the degree of their perceived comfort with mobile technology use. For most participants, mobile devices suffice their need for the quick and brief reading of news, webpages or emails, whereas the sources in print remain as their favorite when they need to read for a long time or towards serious goals. Likewise, both the young adults and the mature adults make a hybrid use of diverse inputting methods to fit different contexts. Touchscreen is found by everyone to be convenient but far from adequate, posing challenges to both navigation and typing. Mechanical keyboard on laptop or PC is always the most ideal device for text-heavy input. Within each age group, there are expressed concern and conflicting opinions on the reliability of mobile technology. It is interesting that a Millennial participant explicitly expresses his limited trust in mobile devices, feeling that an email sent from tablet is not really sent and thus needs to be resent from the laptop. Equally noticeable is one of his cohort participant's comment that she is confident and worry free about using smartphone to send very important messages. These testimonies, along with many others, jointly suggest that neither the young adult group nor the mature adult group is homogeneous. Rather, each of them represents a diverse range of experiences, feelings and opinions.

### *Dependency on graphics*

Compared with the mature adults, the young adults in this study show a stronger attachment to visual elements including pictures, pictorial characters and videos, although different personal traits always persist. A majority of the young adults assert that their favor pictures over words, whereas the mature adults either express no particular preference or

slightly lean towards words. The most effective communication, according to both groups, needs to be a mixed but balanced employment of images and words. That being said, the usage of visual elements on the younger side is noticeably more intensive and more extensive, which ranges from visual note taking in daily life to video presentation in religious gatherings. Speaking of the smiley icons and emoji, four out of the six young adults include them in emails or text messages, whereas only two mature adults have the experience with using them. Overall, the young adult participants demonstrate a considerable level of reliance on graphics, and the mature adult participants have nil to little dependency in this regard.

#### *Comfort with multitasking*

When giving account of their beliefs, feelings and practices associated with multitasking, the participants are found to have individual variances instead of group cleavages. In each age group, there are a couple of participants who define themselves as single-taskers who tend to handle only one task at a time. As for those multi-taskers, their self perceived ability to multitasking varies significantly. Multitasking on computer is a recurring example in the narratives, which is mainly about switching between programs or windows. Music, as well, is frequently cited as a facilitator to multitasking. When some mature adult participants have confidence in multitasking using computer or using no device at all, they identify multitasking using mobile technology as a challenge. There is even a claim that mobile technology is disruptive but not supportive to multitasking. The young adult group, on the other side, shows a slightly stronger confidence in multitasking using mobile devices, although there is someone questioning the eligibility of music, texting and online chatting as part of multitasking. Evidently, the perceptions of the twelve participants regarding multitasking vary from one to another, and no recognizable pattern can be identified in each



age group, which makes a meaningful comparison out of the question.

#### *Comfort with online socialization*

The investigation to the online socialization behaviors concludes with the finding of both commonalities and variations across the age groups, with the young mature adults displaying a higher level of comfort with social media apps and instant messaging apps. The two groups are common first in the importance that they attach to real-world communication. According to both of them, face-to-face conversation is more comprehensive and more effective than online interaction. Another characteristic shared by the age groups is that the online sharing and socialization by the participants are for the most part restricted to people they know in real world, and random friend request from the Internet is usually ignored or declined. Speaking of the differences, the mature adults, first of all, don't text as much as the younger ones. In addition, their level of activity on social media is considerably lower than the Millennial participants. Moreover, the two groups approach to the instant messaging apps on mobile devices with distinctively different manners. The mature adults mostly rely on conventional apps or features such as Skype and Facetime to connect with family members who live elsewhere, with one participant's everyday use of WeChat as the only exception. In contrast, the instant messaging apps employed by the young adults are more diverse, more recent as well as serving more purposes. Finally, it is worthwhile to point out that both the young adults and the mature adults take notice and make use of some language-specific or culture-specific apps, and their social networking or instant messaging activities are closely associated with the sociocultural contexts that they come from and live in.

#### *Expectation for instant gratification and reward*

As judged from the narratives, neither the mature adult group nor the young adult

group typically expect instant gratification and reward from their use of emerging mobile technologies. Most participants relate smartphone to phone calls, texting, and accessing instant information on the move, and view tablet as an e-reader, a media player, or a travel companion. Generally, their mobile devices meet with their needs to a satisfactory level. The utilization of mobile devices for emails, instant messages, and social media is not always passable, though. In this study, some young adults and some mature adults have the experience of a technology being unable to deliver time efficiency as expected, which is usually caused by technical limits or human factors. These participants, overall, don't exhibit anxiety or impatience in their recount of such experiences, although the older ones seemingly have even more tolerance. More important, some mature adult participants provide critical perspectives on the disruptive power of emerging mobile technologies, and deliberately rationalize the extent to which they would use such technologies.

### **Mature Adults, Tablet and Mobile Learning**

As dictated by the second research question, this study narrowed down its focus to the mature adult group after having mapped the mobile technology using behaviors across two age categories. Tablet was selected as the device to be closely examined in the context of the six mature adult participants' work, study and social life. The inquiry centered around the utility or futility of ubiquitous mobile technology as embodied by the tablet. With the progress of the inquiry, the concepts embedded in the research design became apparent, and new topics came forth and developed naturally. The themes eventually identified in this regard are 1.) Device usability of tablet; 2.) The usage of tablet in knowledge consumption, production, sharing and social networking; 3.) Perceived utility or futility of tablet for learning purposes; 4.) Age-related attitudes and aptitudes.

## Device usability of tablet

FRAME, the most important conceptual model in this study, lends an entry point to our discussion of the mobile learning effort made by the mature adult participants, be it formal or informal. Within the context of the current study, tablet exemplifies device (D) in FRAME's Venn diagram and represents the first and foremost construct of mobile learning. Its physical, technical and functional performances directly determine the outset and the outcome of one's mobile learning effort. Put in the focal point of this qualitative inquiry, tablet as an emerging technology receives both positive and negative comments in terms of its usability. The opinions given by the six mature adult participants are summarized as Table 3 below. It should be noted some concepts under "Criteria" and "Properties" are borrowed or adapted from the FRAME model as updated by Koole (2009), after taking into account the subthemes and evidences that have emerged from the recorded narratives.

**Table 3: Device Usability of Tablet**

| <b>Criteria</b>           | <b>Properties</b>   | <b>Excerpt/Example</b>   |
|---------------------------|---|--|
| <b>Physical Features</b>  | Size; weight; appearance; portability                         | <p>"It is not too heavy."</p> <p>"They are easy to take, in a bag, in a pocket."</p> <p>"Because for me, it is really convenient, the small one, the light(weight)."</p>   |
| <b>Input Capabilities</b> | Touchscreen; voice recognition; handwriting recognition; typo | <p>"Like the touchscreen technology, I am really comfortable with this function."</p> <p>"I like the keyboard on the iPad. It's fast, and I have multiple languages."</p> <p><i>"And I would hit two letter at the same time, all the time."</i></p> |

| Criteria                                | Properties   | Excerpt/Example  |
|---|--|--|
|   |  | <p><i>“Because use the iPad (to type), sometimes I need to see it, to watch it, I don’t want to make mistakes.”</i></p> <p><i>“For one thing, yeah, the keyboard on the Samsung (tablet), I always have problems with typing.”</i></p> <p><i>“What I am bad is using Siri.”</i></p> <p><i>“But for me, the ‘handwriting’ (feature) is [pause] seems too slow.”</i></p> |
| <b>Output Capabilities</b>              | Display;   | <p><i>“You can enlarge your screen.”</i></p> <p><i>“It can’t show the two pages at the same time.”</i></p>   |
| <b>Storage Capabilities</b>             | Store; transfer; sharing between devices; sharing between users; retrieval           | <p><i>“...but what’s nice is that I can take a picture on this (phone), it shows on this (tablet).”</i></p> <p><i>“I just sent them (i.e. the deleted apps), you know, delete them and then go up there (in Cloud). And if I want them, I can call them again.”</i></p>  |
| <b>Learnability</b>                     | Device intuitiveness; function transparency  | <p><i>“But the tablet, just one click can install everything, everything.”</i></p> <p><i>“Because you know, it is pretty straightforward.”</i></p> <p><i>“...all I know is that you can’t do anything wrong. So I always go and try it.”</i></p>   |
| <b>Psychological Comfort</b>            | Feeling; presence or absence of hardship   | <p><i>“Because I don’t touch the real things (on tablet).”</i></p>   |
| <b>Connectivity &amp; Compatibility</b> | Connectivity to Internet; software compatibility; connectivity with periphery device | <p><i>“Through this kind of electronic devices, you can access Internet everywhere.”</i></p> <p><i>“...because I cannot use my USB (with the tablet).”</i></p> <p><i>“I think some software, I still can’t really use, get</i></p>   |

| Criteria            | Properties                   | Excerpt/Example  |
|---------------------|------------------------------|--|
|                     |                              | <i>used to it from iPad.”</i>  |
| <b>Satisfaction</b> | Functionality;<br>must-have; | <p>“...for me, I think now it’s enough.”</p> <p>“I will use it the way I’ve used for the last number of years.”</p> <p>“Well, I think it’s pretty good.”</p> <p>“I can’t live without them.”</p> <p><i>“I can do without it. But it’s useful, yeah.”</i></p> |

**Note:** Excerpts and examples in italicized font are neutral or negative comments.

As Table 3 reveals, the accounts given by the mature adult participants are rather positive in the dimensions including “physical features”, “storage capabilities”, “learnability” and “satisfaction”. They spoke good of the lightweight and portability of the tablet. The synchronization of data between devices and the recently developed Cloud storage technology, when a tablet was involved, were met with supportive appreciation, too. The mature adults also thrived on the intuitiveness and transparency delivered by tablet, and seemingly took it as a promise for low cognitive difficulty and high learnability. Although the frequency or intensity of their tablet usage might vary, they were overall satisfied with this specific device. On another note, some mature adult participants expressed negative or mixed feelings towards the tablet technology in terms of its input and output technologies, compatibility with peripheral device or software, and the physical and psychological comfort that it delivers. Noticeably, most negative comments were about the input technology, which comprises of the touchscreen input and its alternatives such as voice recognition and handwriting recognition. As per the testimonies, the touchscreen input is intuitive, fast, but not always accurate, and it has no adequate alternatives so far.

With a view to confirming the learnability of tablet as implied in the comments on device intuitiveness and function transparency, the mature adult participants were invited to review the experience how they acquainted themselves with the tablet technology. The responses indicate that the mature adults experienced different levels of cognitive load when learning the tablet technology. Friends, family members, especially the children of senior participants, have been an important resource of assistance. Yet, while some of them felt “we’re kind of left out,” some others were lucky to have taken advantage of the technical support and workshops provided mostly by the manufacturers. Prior knowledge also plays a significant role in such a learning process. According to one participant, “So I had the Macbook, then I got the iPhone, then I got the iPad. And I found the iPad easy because I was used to the other Apple devices.”

The inquiry into the usability of tablet concluded with an evaluation of the overall ease to use a tablet according to a five-level Likert scale. The responses from the mature adult participants are summarized in Table 4.

**Table 4: Perceived Level of Ease to Use a Tablet**

| Question  | Responses (n = 6) |           |               |           |           |               |
|---|-------------------|-----------|---------------|-----------|-----------|---------------|
|   | Very easy         | Easy      | Moderate      | Hard      | Very hard | Other         |
| How would you rate the level of ease to use a tablet? | 2<br>(33.33%)     | 0<br>(0%) | 2<br>(33.33%) | 0<br>(0%) | 0<br>(0%) | 2<br>(33.33%) |

**Note:** Two responses are marked as “Other” since an interviewee believed that the level of ease to use a tablet depended on the specific needs of the user, and another interviewee found the level between “moderate” and “easy”.

**The use of tablet in knowledge consumption, production, sharing and social networking**

Given the extent to which the emerging mobile technologies have been interwoven into the work, study and social life of today’ people, it is impractical to quantitatively measure the frequency of tablet use in the formal and informal learning efforts made by mature adult learners. Therefore, this qualitative inquiry deliberately selected apps, “the most used tool to deliver mobile content and services” (Gonzalez-Mendez & Ferrer-Roca, 2012, p. 46), as a relevant specimen to examine the level of activity of tablet in various types of learning initiatives. Put more precisely, by asking the participants to reflect on their experience of using tablet apps for the purposes of knowledge consumption, knowledge production, knowledge sharing and social networking, this qualitative inquiry could probably gain a meaningful if not thorough view of the presences of tablet, mature adult learners and social influence as well as the interaction between these three agents, in the context of information acting as “a shifting and growing frame of reference” (Koole, 2009, p. 38). Table 5 summarizes the tablet apps or features that were either preloaded or installed but really used by the mature adult participants in this study.

**Table 5: Overview of Tablet Apps Used by Mature Adult Participants**

| Type of Activity             | Type of Apps            | Excerpt/Example  |
|------------------------------|-------------------------|--|
| <b>Knowledge consumption</b> | <i>E-reading apps</i>   |  |
|                              | Preloaded reading apps  | “I use it, like iBooks, that built-in app for the Apple iPad.”   |
|                              | Downloaded reading apps | “I also use the Adobe PDF Reader.”<br>“And then I got the Kindle, the iTune Kindle. So I used that.”<br>“Yes, Financial News.”<br>“Westmount Library.... I tried it once during the vocation.” |

| Type of Activity      | Type of Apps              | Excerpt/Example   |
|-----------------------|---------------------------|---|
|                       |                           | “The Globe and Mail ( <i>app</i> ), reading The Global and Mail, I think it’s learning.   |
|                       | Web browser               | <p>“Most time I just use the tablet to go to the webpages.”</p> <p>“What I do is I’ll look up some type of topic, I’ll see, put the topic in (<i>a search engine window</i>), and I’ll see what comes out.”</p> <p>“No, my special, I think, it’s a Chinese website.... I use it, most time I use it online.”</p> |
|                       | Others                    | <p>“I downloaded on the Youtube a lot of, a lot of lessons that you can download to learn from.”</p> <p>“Podcast.... I used to (use it), but I don’t have time for it.”</p> <p>“...when we travel, we use the tablet for our news.”</p> <p>“So sometimes we watch TV shows on those. On tablet, as well.”</p>     |
| <b>Reference apps</b> |                           |   |
|                       | Preloaded reference apps  | N/A   |
|                       | Dictionary                | <p>“In my iPad, I have some English dictionary”</p> <p>“Yes, the dictionary (<i>on tablet</i>) is French to English, and Chinese to English, not only French.”</p>  |
|                       | Map                       | <p>“I also have the digital map apps.”</p> <p>“And Google Map.”</p> <p>“Google Maps to find places. So that’s very handy.”</p>  |
|                       | Handbook and encyclopedia | “I also have the encyclopedias ( <i>apps</i> )”   |
|                       | Others                    | “I don’t have the ( <i>Wikipedia</i> ) app. But I Google it, and I go   |



| Type of Activity            | Type of Apps  | Excerpt/Example  |
|-----------------------------|---|--|
|                             |   | from there.”   |
| <b>Knowledge production</b> | <i>Note-taking apps</i>   |  |
|                             | Built-in apps for notes, memo and reminder  | “So for example, my wife has an iPad as well. And we have a set of things, well, in the Notes or the Reminders, Pictures.”<br>“Yeah, I use it a few times.”                                  |
|                             | Downloaded apps for notes, memo and reminder  | N/A  |
|                             | Others  | “Take notes from my notebook, I just write it. And later on, if I want to, you know, in my calendar to remind me, if I want to, I will put it there ( <i>on the tablet</i> ) as a memo.”     |
|                             | <i>Productivity apps</i>  |  |
|                             | Text editing apps   | “Just like I said, when we go outside, we are travelling or something like that, if I have some new idea, I want to change something, I will, like also to use the tablet to do some works.” |
|                             | Photo/video editing apps  | “A few uses with iPhoto.”  |
| Others                      | One participants uses the Arts apps such as iPallock, Waterlogue, Blueballs, and Impressionist to draw on tablet. (Example) |  |
| <b>Knowledge sharing</b>    | <i>Storing, transferring, and sharing apps</i>  |  |
|                             | Device’s own storage space  | “So I store a lot of books, even papers on the tablet, because, its mobility.”   |
|                             | Cloud   | “And what I love about this ( <i>smartphone</i> ) is that you can have   |

| Type of Activity                     | Type of Apps                    | Excerpt/Example  |
|--------------------------------------|---------------------------------|--|
|                                      | storage                         | the stuff transferrable between this and the tablet. And the laptop. Between the devices.”<br>“So they ( <i>i.e. the deleted apps</i> ) are all on the Clouds now.”  |
|                                      | Others                          | A participant used to use the Kindle app to share e-books with another Kindle user. (Example)<br>A participant shares Photos and some articles with her Friends via the Moments feature in WeChat. (Example)   |
| <b><i>Web publishing apps</i></b>    |                                 |  |
|                                      | Blog                            | N/A  |
|                                      | Tweeter                         | N/A  |
|                                      | Others                          | “When I have done something, I take a picture of it, with the iPad. And then I send it to my friends.”<br>“On FaceBook I post when I have done a painting I think is not too bad. I put it on FaceBook.”<br>“And I actually put something on the Facebook page yesterday, for the first time.” |
| <b><i>Instant messaging apps</i></b> |                                 |  |
| <b>Social networking</b>             | Instant messaging apps          | “Yeah, we use Skype on, yeah, the tablet.”<br>“I do Facetime, yes, Facetime, with my granddaughters.”<br>“We have done Skype. We’ve done more Facetime than Skype.”<br>“Like WeChat, it is like everyday ( <i>use</i> ).”  |
|                                      | Random friend finding apps      | N/A  |
|                                      | Others                          | N/A  |
|                                      | <b><i>Social media apps</i></b> |  |
|                                      | Text-based                      | “Or there is Facebook that I go to.”   |

| Type of Activity | Type of Apps             | Excerpt/Example  |
|------------------|--------------------------|--|
|                  | social media             | “Facebook. Oh, I am on it. I check it not so often. I am not on it all the time.”        |
|                  | Image-based social media | N/A  |
|                  | Others                   | “I think I have the WeChat.”<br>“I am on LinkedIn, but I don’t really use it very much.” |

**Note:** N/A stands for “not applicable”, which means that the participants made no comment or the comment was not relevant to the discussion here.

As per the accounts given by the mature adult sample, the role of tablet as a mobile device for consuming knowledge and instant information is visible and evident. Generally, these mature adult participants used the downloaded apps or the websites more than the preloaded apps so as to meet with their personal reading preferences. Some participants were interested in information in certain areas, and others needed to locate sources in special formats. Likewise, while using the tablet to access reference sources, the participants mostly turned to downloaded apps or specific websites as driven by their need to learn a foreign language, to find directions, or to get an answer to an exact question. The frequency of using e-reading and reference apps by these mature adults varied from not anymore to everyday everywhere. For instance, among the sample, there was a participant who had done away with the Kindle app on tablet, finding the e-reader Kindle itself “smaller”, “easier” and offering more natural light to read. Likewise, another participant put an end to his tablet use of a community library app after an uncomfortable trial use of it during a vacation. In his own words: “The sun was shining too much. I couldn’t review. So I got a book.” Despite these negative experiences, the mature adult participants actively used their tablet devices for all

kinds of e-reading activities. It should be noted that in this study, the concept “e-reading” was not restricted to “reading” in literal sense. Accordingly, the accounts of “knowledge consumption” involved not merely books and articles but also instant information, community authored knowledge, news, videos, TV programs and podcast, which, to an extent, reflected the multimedia nature of both the information content and the information technology in this digital era. Evidently, these mature adult participants were not indiscriminate consumers of instant information and community authored knowledge. When Wikipedia was repeatedly cited as a reading source in the narratives, the participants always took it with skepticism. In one participant’s words, “I don’t trust it (*i.e. Wikie*) because anyone can add to it, right? But it is interesting. It gives you an idea.”

Compared with their use of apps for knowledge consumption, the mature adult participants employed much less the tablet apps to produce knowledge, or for the purpose of this discussion, to produce any information associated with values, beliefs, utilities or meaningful substances. Note taking, at first, was mostly conducted by hand. Less than half of the mature adults had the experience of using a tablet to take notes, in addition to one participant who habitually wrote her notes and occasionally transferred them into the Memo feature on tablet. Moreover, the text editing and picture editing apps, albeit thousands of them being available in app stores, were significantly underused by the mature adult participants. As per the narratives, either some participants were unaware of the mobile versions of those popular text editing and picture editing software, or some of them preferred to continue their use of such software on laptops or computers. There was a participant who used his tablet to document some ideas and modify some unfinished work when travelling. Strictly speaking, in his case, the role of tablet as a device of productivity was not clear enough due to the casual

nature and the small size of the product. The only exception in this sample was probably the utilization of some Arts apps on tablet by an amateur artist. Indeed, this participant accomplished, via these apps, diverse work like sketches, watercolors and oil paintings.

The mature adult participants shared information or knowledge via tablet to a rather limited degree, in the sense of both breadth and depth. The sharing, first of all, involved mainly data synchronization between devices and posting on semi-closed social media. A couple of mature adult participants took advantage of the emerging Cloud computing technology for data upload and data retrieval, finding it fast and convenient. Being an enthusiastic reader, one participant expressed her concern on the limited transferability of e-books on mobile devices. Noticeably, this mature adult sample made no use of the web publishing tools such as personal websites, blogs, micro-blogs, either from tablet or on computer. Nor were they active in the photo sharing communities such as Instagram, Flickr, Picasa and so on, although their online sharing activity was for the most part related to photos. Emails were the most frequently used method for the mature adult participants to send their work to friends or family members. Some of them also posted on social media from their tablets, but again, not very often and not very much. Based on these considerations, it is fair to conclude that the device tablet contributed very little to the knowledge and information sharing by these mature adult participants.

A message conveyed in the aforesaid information sharing activities is that up to today, the features like web publishing and instant messaging have been largely integrated into multimodal social media, which makes an isolated discussion of each of them nearly impossible. That being said, the six mature adults in the sample all had experience of using instant messaging apps on tablet, whereas only half of them were social media users, if

defined strictly. While doing instant messages on mobile devices, the participants usually used the multimodal messaging apps such as Skype or the video talking features such as Facetime. It is noteworthy that one participant expressed her personal discomfort with video talking. In her words, “I don’t like to be caught unawares (by the camera).” Equally mentionable is that two other participants lost interest in Skype after having used it for a while, which were due to instable Internet connection and the time difference between homeland and residing country respectively. Therefore, psychological feeling, technical issue, and sociocultural background all factor into the mature adults’ choice and use of instant messaging apps on tablet. The tablet use of social media by the mature adult participants, on another note, exhibited a considerable degree of coherence. Two participants were on Facebook, and one participant was on WeChat, a Chinese social media app with the instant messaging function. One thing shared by these users was that they checked and read the updates on social media at a moderate to high frequency, but not posted that much by themselves. The Facebook users showed a reserved acceptance of the information available in social media, describing some of it as “not necessary.” Similarly, the WeChat user took notice of the inconsistent and sometimes conflicting information that people posted or reposted. For these social media users, their contacts seldom went beyond the social circles they belonged to in real life. Among the non-users, there were participants who were disinterested or unfamiliar with social media like Facebook. Speaking holistically, tablet as the device agent fails to achieve a distinct visibility in the already limited online socializing activities by mature adults. One possible reason is that smartphone steals away a large portion of the instant messaging and social networking activities from tablet. There were, from time to time, narratives that mixed up the two devices, for instance.

## Perceived utility of tablet for learning purposes

With a view to further clarifying the subtleties and complexities surrounding the role of tablet in both unintentional and purposeful learning, the mature adult participants were invited to reflect on the weight of learning activities in their overall tablet usage and then translate it into a rough percentage. Table 6 outlines the responses collected in this regard.

**Table 6: Perceived Percentage of Learning Activities in Overall Tablet Usage**

| Question   | Responses (n = 6) |               |               |               |
|--|-------------------|---------------|---------------|---------------|
|  | Under 10%         | 10-30%        | 30-50%        | Above 50%     |
| About what percentage of your tablet use activities do you consider to be a learning experience? | 2<br>(33.33%)     | 1<br>(16.67%) | 2<br>(33.33%) | 1<br>(16.67%) |

It should be noted that while reflecting on their learning experience involving the tablet technology, some mature adult participants got stuck in the concept “learning” for a while. There were participants wondering whether reading news could be considered as a meaningful learning experience. There were participants believing that their answers would indeed depend on how “learning” was defined in this study. After being asked to define “learning” in their own way, the participants briefly reviewed their learning activities on tablet and gave their percentage numbers.

As indicated in Table 6, a couple of mature adult participants identified less than 10% of their tablet use as learning experiences. These two participants are alike in the sense that tablet is no more than a travel tool for each of them, and their learning activities on tablet is mostly about brief news reading on trips. The one who was placed in the 10 to 30 percent zone actually saw about 25 percent of his tablet use as learning in strict sense,

and saw at least 50 percent of his tablet use as learning if the concept was loosely defined. In his own words, “I use it a lot as a resource for getting information.... I think sometimes you are learning stuff anyway. You are not saying to yourself: ‘I am doing this to learn.’” As for the two participants who identified 30 to 50 percent of their tablet usage as learning, one of them used the tablet heavily for leisure reading, instant messaging, and social networking, and another one capitalized on the multimedia sources available through tablet to learn arts as well as employing diverse apps to produce artwork on tablet. Finally, the only one participant who dedicated over half of tablet usage to learning was a full time wage earner as well as a part-time Ph. D student. In his case, the tablet was mainly employed as an e-reader for not only instant information and also scholarly books and articles, and he used it for reading on a everyday everywhere basis.

In addition to weighing the essence of learning in the entire tablet usage, the mature adult participants were also invited to evaluate the overall utility of tablet for learning purposes according to a five-scale liker scale. Their responses are summarized in Table 7.

**Table 7: Perceived Utility or Futility of Tablet for Learning**

| Question   | Responses (n = 6) |               |           |           |              |               |
|--|-------------------|---------------|-----------|-----------|--------------|---------------|
|  | Very useful       | Useful        | Moderate  | Useless   | Very Useless | Other         |
| How would you rate the overall utility of tablets for learning purposes? | 3<br>(50%)        | 2<br>(33.33%) | 0<br>(0%) | 0<br>(0%) | 0<br>(0%)    | 1<br>(16.67%) |

**Note:** One response is marked as “other” since an interviewee gave no comment on this question.



The findings on the learning utility of tablet are overwhelmingly affirmative, which apparently departs from some participants' self perceptions about their low to moderate usage of tablet for learning purposes. It is understandable, however, as the low percentage numbers in Table 6 by no means represent a low level of activity of the participants as either mobile learners or lifelong learners. As discussed earlier, laptops are still the more comfortable way for some mature adult participants to do tasks such as long time reading, heavy-text input, spreadsheets, and so on. Smartphones, on another hand, are equally or even more convenient than tablets for small tasks such as texting, emails, and checking social media updates. As a natural outcome, the role of tablet is more evident when it is used as a device for consuming the information in the formats of image, video, text, and most often multimedia. Its learning utility is much less obvious, unless we examine it more closely, more carefully, and more critically. Such a meaningful examination of the tablet technology is exactly what this qualitative inquiry aimed at, strived for and hopefully achieved in the end by both the researcher and the six mature adult participants.

### **Age-related attitudes and aptitudes**

Across the narratives given by the mature adult sample, the age factor was repeatedly cited to describe or even explain certain attitudes and aptitudes associated with tablet use and mobile learning. First and foremost, a majority of the mature adult participants were concerned about the overuse of and over-dependency on technology that they observed in modern society and especially the young generations. According to a participant,

Now I have a sense sometimes, that some young people have a problem, because they do (online) most replaces real contact. People are so busy communicating via email,

via text, via Facetime, via Facebook. They are doing a lot of stuff. But they don't see each other that often. And it's not the same.

On another note, he continued his critical reflection on this phenomenon by saying,

I think one of the things is that using the phone, using the tablet is, almost makes it easier to just barely touch the surface , to sort of just be visiting instead of actually being there.

Behind this testimony there was a worry that emerging mobile technology, if abused, could make modern people and especially the youth miss out the essential meanings, true attachments, and authentic involvements that were vital to one's life journey. This worry was acutely felt and largely shared by the entire mature adult sample. It also accounted for the rationalized use or even deliberate underuse of mobile technology including tablet by some mature adult participants.

Another age-related concern identified in this sample is that some mature adults tended to relate the hardships they encountered to their age instead of other factors. For example, when being asked to evaluate the level of ease to use a tablet, a participant commented,

It's just, I think, to be honest with you, it's more work for somebody of my age than it's somebody in their twenties or their teens. It's just because we didn't grow up with it, you know? I think we can do it. And I think they make it pretty easy.

Both age-related concern and confidence can be identified in this account. However, confidence was somehow absent when another participant recounted the difficulty he had with the touchscreen input technology, According to him, "I also saw some young guys use virtual keyboard on tablet, they also can type the words fast. But for me, no."

Additionally, a participant explained a couple of differences that she observed between the younger ones and herself. Being a non-user of text messages, the participant suggested that “young people like these short, little blurbs of information.... Three or four words.... It’s not something that comes naturally to me. So I would not.” When reflecting on the necessity of cellphone, she commented,

You know, I have to think: “Oh, yeah, pick up take the phone! You’ve got the phone in your pocket or your purse. Use that!” I don’t ever think about it. I never have it in my hand. I never. It’s not part of me the way. It’s part of young people or people today.

Last but not the least, while the mature adult participants unanimously attached a high level of learning utility to the tablet technology, a couple of them also put forth that age or social role might have significant implication on one’s tablet-assisted learning behaviors. According to a participant, “...so I think it (*i.e. the tablet*) has potential, maybe not for me so much because, [pause], but for young person, I think it has great potential.” Likewise, another participant stated: “if I was a student, maybe I would be more particular, maybe. But for my purpose, I think it (*i.e. the tablet*) is great.”

To sum up, during the entire process of qualitative inquiry, there were mature adult participants who consciously positioned themselves as belonging to the “old” generations. Yet, compared with the younger ones, these mature adults have more knowledge and more experience with the technology evolution of decades’ length, which in turn gave rise to a wealth of critical insights on the possible role of mobile technology at both individual and collective levels. Such insights are indeed most needed in today’s mobile learning studies.

## Concerns, Difficulties, and Expectations

Before the qualitative inquiry was concluded, the participants were asked about the extra concerns, difficulties and expectations that they might have regarding the use of tablet for learning purposes. Most of the collected responses were centered around the possible improvements of the device usability, in addition to a couple of concerns on the potential risks associated with the use, or more precisely, the abuse of mobile technology. Some respondents also hold a shared vision of the future of mobile technology, foreseeing an upcoming hybrid device that integrating all the important functions and features.

Viewed retrospectively, the input and out technologies associated with the touchscreen, the instable Internet connectivity on trips, and the online searches that could be often time-consuming were identified as the major issues that had posed difficulties to the tablet use by the mature adults. Three out of six participants expressed frustration in their experience of using the touchscreen to type or to position a cursor and insert text. One participant complained that unlike computer, tablet didn't allow for the display of multiple windows at a time, which made the between-windows comparison and multitasking out of the question. Another participant was disappointed that her tablet didn't support the USB device. For those who used tablet mostly as a travel device, the instable Internet connectivity constituted a big concern. In addition, there was a participant who often took pains to develop effective search strategies when using his tablet to access specific information. Overall, these concerns are related to the usability of the tablet device itself as well as its peripheral technologies or skills.

It is noteworthy that a couple of respondents identified the lack of resources and technical assistance in their tablet use experience. According to one of them, "I think we don't

use our devices the way we should be because we don't have easy access to information and help on how to set things up, all the different applications that you, you know, you could use.” Another respondent cited his experience of using the preloaded tutorial on tablet. In his words, “But to me, that's quite difficult. You know, you almost got, get to the point and write it down what you have to do. Then go out of it and try it out, the thing, you know, so.” These testimonies are important in the sense that they evidenced a need for support and services on the mobile technology user side, which should not be overlooked by the industry as well as the research community on mobile technology and mobile learning .

The implication of ubiquitous mobile technology on individuals and the society as a whole, which was repeatedly mentioned in the narratives, re-emerged as two participants' biggest concern in the end of the inquiry. An everyday user of instant messaging and social media questioned that while mobile technology was intended for closing up the distance between people, how close it could be and should be? The message implied was that mobile technology could be either productive or intrusive, and the user has to handle it with prudence. Similarly, another participant saw the need for “more substances in the apps for learning and teaching social skills.” In her opinion, the market offered “too many apps for no good”, which led some adolescents and minors into unproductive and addictive gaming and even antisocial behaviors. Therefore, the development of more education apps along with a stricter control on unauthorized in-app purchases by the minors was suggested as a possible improvement in today's emerging mobile technologies.

In the end of the inquiry, a couple of mature adult participants presented their forward-looking visions of the emerging mobile technologies. The visions were common in the sense that they both took notice of the convergence of diverse technologies and predicted an

upcoming product that is a hybrid of smartphone, tablet, and devices alike. The recently released iPhone 6 and iPhone 6 plus were cited as early examples of the emerging “phonelet”, which represented a phone and a tablet in one. While acknowledging the possibility of a future hybrid product being more popular than conventional computing devices, one mature adult participant, nevertheless, insisted that there would always be a place for the computer, or in his words, “the super computer”, especially for the companies who are engaged in technology development and research. Overall, these visions foresaw a bright and hopeful future of technologies. “Then the question is going to be if you have prepared”, a participant concluded his narratives with this mature and thoughtful remark.

## Chapter 6: Implications, Recommendations and Conclusions

With the entire sample comprising six mature adult participants and six young adult participants, this qualitative study was able to first establish a descriptive profile for each age group in terms of mobile technology using behaviors. Commonalities and variances were identified both within each group and between the groups. There was little evidence pointing to the age factor as a determinant in the dimensions including one's adoption of, comfort with, and expectation for mobile technology. Their self perceptions of ability to multitasking varied from one to another, but exhibited no age-specific characteristics. The young adult sample, nevertheless, showed a conspicuously higher level of dependency on graphics than the mature adult sample, which was mostly evident in their stronger attachments to visual elements when communicating online and offline. Sociocultural context and security concern both factor into the online socialization activities undertaken by the two age groups, which entailed their use of some culture-specific and language-specific social media as well as the fact that their online contacts largely overlap their acquaintances in real life. While the younger ones appeared to have a more extensive and more diverse use of instant messaging and social media apps on mobile devices, they didn't differ significantly from the older participants in regards to their rationalized expectation for instant gratification. Overall, the narratives given by the twelve participants demonstrated a considerably high level of satisfaction with the emerging mobile technologies.

In addition to having gained a cross-category view, this qualitative inquiry also performed a more focused examination on the mature adult participants' tablet using

behaviors, especially those involving learning effort or inducing learning results. With the data being analyzed from the perspective in Koole's (2009) FRAME model, the tablet device was found to meet with or possibly exceed the mature adult sample's expectations for its physical features, storage capabilities, learnability, and overall functionality. The input and out capabilities and the hardware and software compatibilities of the device, on the other side, gave rise to difficulties and frustrations in the mature adult users. Partially due to these technical limitations, the presence of the tablet technology in the mature adult participants' learning initiatives was identified as low to moderate. The role of the tablet as a device agent in mobile learning is mostly evident in the aspect of knowledge consumption, while it was used by all the mature adult participants to access and read information of diverse types in diverse formats, albeit to varied extent. Its role as a device for knowledge production is relatively insignificant, since most mature adult participants tended to use it for small tasks and very short text editing, with one amateur artist's utilization of many tablet Arts apps as the only exception. Equally mentionable is the limited use of tablet for web publishing and information sharing among users. In addition, psychological feeling, technical concern, and sociocultural background all factor into the mature adult participants' selective and limited use of instant messaging and social media apps on tablet. The low visibility of the tablet technology in these regards, however, can be partially excused due to the fact that laptop and computer remain the most favored devices for the more serious purposes in work, study and social life, and smartphone, on another note, snatches away from tablet a lot of casual web browsing, instant messaging, and small tasks.

Among the concerns and expectations expressed by the mature adult participants,



there were a series of age-related and culture-related perceptions, which were highly relevant to today's technologic and social realities. First, some mature adults observed different attitudes as well as apparently varied abilities when comparing their mobile technology using behaviors with those of the younger ones. These differences, according to them, were visible in both the device using habits and the pertinent preferences for information genres, communication means, and so on. Age was identified as relevant but not determinant in these accounts, however, since the mature adult participants cited the possible impacts from society and culture, as well. Secondly, compared with the young adult participants, the mature adult participants felt a stronger drive for skilling and reskilling themselves with the emerging technologies, which was closely associated with their years of experience with computing technologies as well as a strong will to keep up with but not become subject to the fast-paced world. Indeed, a worry was shared by many mature adults that the ubiquitous computing technologies like tablet, if handled improperly, could have detrimental effects on the society at large and the young users in particular. Always attaching important meanings and irreplaceable values to human contacts in real world, these mature adult participants advocated a rationalized use of mobile technologies and an introduction of more substance and more quality in the mobile apps.

Across the narratives, there were, from time to time, expressed frustrations associated with the device usability of tablet, with the touchscreen inputting and outing technologies being repeatedly stressed as inadequate or inefficient. A need for stable Internet connectivity was put forth by a couple of mature adult participants as very important, especially when tablet was used as a travel device. Suggestion was also made to make available more resources, more services, and more technical assistance from pre-

purchase to after sale with a view to promoting a fuller, better, and more informed use of the tablet technology on the user side.

### **Implications**

This study has limitations on many fronts, but also has gained a number of meaningful, relevant and critical perspectives from its twelve participants. The amassed qualitative evidences imply a strong potential of emerging mobile technologies like tablet for learning, especially when placed in this post-PC context where information is produced, spread, and consumed at an unprecedented rate. The theoretical interpretation of the findings also prompt a review and rethink of learner, technology, society, and finally learning as the expected outcome of the interactions between the former three agents.

The pre-Millennial generations, conveniently defined as mature adults in this study, need to be rewarded with stronger visibility in today's mobile learning studies before the scholars and the practitioners work towards an enhancement of their participation in mobile learning initiatives. First of all, mature adults are by no means a homogeneous group. Rather, they approach learning and technology with varied beliefs, diverse prior knowledge, versatile experiences, and uneven expectations. For those who are early adopters and experienced users of technologies, they are usually sensitive to both the opportunities and the risks implied in emerging device or innovation, and therefore are more likely to have critical thoughts and make a rationalized use of mobile technology for activities including but not limited to learning. The mature adults who lack technological experience or resources should not be excluded from the mobile learner, neither. Compared with their technically adept peers or the younger generations, these mature adults are equally active participants in lifelong and life-wide learning. Based on these

considerations, the mobile learning studies in the future need to attach more importance to the mature adult learners instead of continuing focusing on the younger generations.

The development of technology in general and mobile technology in particular needs to be aligned with meaningful goals and social values. When being employed for learning purposes, the technology should be able to impart more substance and more meanings instead of simply delivering accessibility, convenience, and efficiency. As exemplified by this study, the presence of mobile device as the technology agent in the dynamics of mobile learning could be somehow low even though the device itself is identified as having a high level of usability. It is possible that the use of the device is hindered by its technical limits. More importantly, if the learner don't find the mobile apps having advantages over their software counterparts on computer or laptop, none use or underuse may ensue. Nor will the user use the mobile device to engage in purposeful communication for collaborative meaning making and problem solving, which is highly desirable in the COI and FRAME models but didn't take place in this study's narratives. Therefore, the role of technology in mobile learning is more associated with the quality of the knowledge that it allows the learner to learn, to share and to produce, and less linked to its physical functionalities. Hopefully, it is not too late for the industry of mobile technology and pertinent businesses to take a step back from their obsession with innovation and "creativity". Statistics reveal that as of July 2014, the world has altogether 1.3 million Android-based apps and 1.2 million IOS-based apps available to choose from (Statista, 2014). These numbers are ever growing, given the fact that every month, nearly 20,000 new apps are added into App Store alone (Rowinski, 2013). It always remains a question that how many of these apps are really used and truly useful. Equally dubious is

how the claimed ubiquity of today's mobile technology is fulfilled in everyday realities. For instance, there are people who never use their tablets except when travelling. There are, as well, people who use the tablets at home and on trips but never bring them to schools, workplaces or other public spaces. Despite these uncertainties, the testimonies collected from the mature adults in this study, nevertheless, lend to the industry as well as the society a mature and socially responsible attitude towards technology in general and mobile technology in particular.

Noticeably, the social and cultural factors that have influenced the technology adoption and using behaviors of the adult learners continue to have implications on their mobile learning activities. Therefore, effort needs to be made towards the translation of the sociocultural specificities to supportive factors in mobile learning. First, friends and family members could simultaneously be a resource of help and a reference point that influences the uptake and use of mobile technology by both mature adults and young adults. Additionally, the fact that the online contacts significantly overlap the social circles in real world implies a possibility of "reproducing" some learning communities on the virtual space without sacrificing the warmth, the attachment and the shared visions that have already been achieved in the physical world. Such "reproduction" should not be simply a digitalization of teaching and learning artifacts or an online extension of the socializing activities among the members. Rather, it should be a collaborative effort driven by concrete learning goals and continuously enriched by the input from the members. While the conventional computing technologies significantly restrict the e-learning initiatives to higher education and business world, the emerging mobile devices along with the Cloud computing technology unerringly imply more flexibility and less pain in structuralizing,

uploading, accessing, co-authoring, web publishing, and so on. Given these considerations, the “reproduction” of learning communities by way of mobile technology, if handled properly, can reasonably expect constructive and productive outcomes. Last but not the least, while some language-specific and culture-specific apps significantly facilitate the exchange of information, ideas and possibly knowledge within the learners from a same ethno-cultural background, they could also foster a habitual dependence and therefore prevent the learners from reaching a broader range of knowledge seekers and knowledge contributors. When designing or undertaking a mobile learning initiative involving multicultural users, the mobile learning architects or the learners themselves need to pay due attention to such culture-specific preferences and possible dependencies associated with them.

Learning, in this information-rich and technology-abundant era, has become more intangible, more fluid, and more complex than ever. From the four pillars postulated by UNESCO to the three way interactions presented by COI and FRAME, the multifaceted and multilayered nature of learning has been illustrated to detail. In real life, learning is way more pervasive and way more important than those ubiquitous technologies. Yet, the ubiquitous technologies challenge the beliefs, values and practices of learning on many fronts. First, the dubious validity of instant information, which means the information accessed virtually at the same moment of the retrieval action, calls into question the definition of knowledge in the twenty first century. Noticeably, instant information was claimed to be the currency of electronic media as early as two decades ago (Warger, 1990). With the arrival of ubiquitous computing technologies, the world sees an explosion of instant information, with pictures, texts, videos or multimedia sources coming to mobile

devices with no delay. The meanings, value and importance implied in a great many pieces of instant information are probably very limited, according to the accounts given by the mature adult sample in this study. This comment is based on their experience of reading online the community authored articles, the posts in social media, the website updates, and so on. Given the overwhelming volume of instant information today, it would be hard for the learner including the adult learner to discern truth from error or separate knowledge from nonsense. Within the context of this study, the adult participants' responses towards instant information ranged from indiscriminate acceptance, judgment based on common sense, judgment based on comparison between multiple sources, and utter rejection. These findings suggest that a first and foremost task in mobile learning is to equip the learner with both information literacy and information technology literacy so as to ensure that their online communicating, sharing, socializing and learning efforts are meaningful from the beginning through the end. Another challenge that ubiquitous mobile technologies pose to learning is that learning itself becomes increasingly fluid, apparently effortless, but probably more painstaking than ever. As observed in this study, what learning should be and could be is a concern largely shared by the adult learners. When a participant excluded gaming from his learning experience at a point, he commented at another point that sometimes people learn stuff anyway. The uncertainty surrounding learning also invites questions about the due effort required in learning. For instance, a young adult participant commented on the "committed follower" phenomenon in social media, finding some people giving prompt feedbacks without really reading the original posts. Likewise, re-blogging, re-tweeting and reposting accounted for a considerable proportion of some participants' online activities. Are the interactions between the post author and his

“committed followers” related to the projection and sharing of “personal characteristics” as implied in COI and “sign systems” as implied in FRAME? To which extent can the activities such as re-blogging, re-tweeting and reposting be counted as knowledge sharing? These are only two examples of a great many questions that ubiquitous mobile technologies pose to learning including mobile learning, and they would have to await future studies for possible answers.

### **Recommendations for future research**

Indeed, this study is a humble attempt to create a descriptive profile of adult learners in the dynamics associated with emerging mobile technologies, and future studies are needed to refine, validate and expand the data that have collected so far. Improvement could be expected in the following dimensions:

#### **Possible modifications in sampling**

The existing sampling method, which relies heavily on purposeful sampling and snowballing, is found to be time efficient and proper for the purpose of this small-scale inquiry. Yet, it is definitely inadequate for future studies aiming at better representativeness and stronger reference value. First, the sample size needs to be increased for sure. Moreover, the existing age distribution in each age group is not fairly reflective of the distribution in real life. In the mature adult sample, there are two participants aged from 41 to 49 and four participants aged above 60, and no one in the 33 to 49 or the 50 to 59 age range was recruited. Similar problem is present in the young adult sample, too. In addition, there needs to be an enhanced sample diversity. Gender, educational level and employment status were considered as part of the personal data in addition to age in this study, and they, along with other demographic factors, probably could be given with more weight during

the sampling process of future studies. For instance, Maximum Variance Sample is a possible way to incorporate such factors as selection criteria for diversity dimensions.

### **The need for a more comprehensive and more consistent comparison**

It should be noted that the narratives given by the young adult sample were coded but not analyzed to full extent, since the last two research questions were focused on the mature adult sample only. That portion of data was found to be rich and strong in the sense that it covered a great many lived experiences and valuable insights from the young adult camp, most of whom are regular tablet users. Unfortunately, a comparison between the two age groups' tablet uses for learning is beyond the scope of this thesis. A more comprehensive inclusion of both age groups is thus recommended for future research, and a more consistent method is needed to align more closely the data collection, the data analysis, and the discussion of results. The Constant Comparison method, which is described by Goetz and LeCompte (1981) as a combination of inductive category coding and “a simultaneous comparison of all social incidents observed” (p. 58), suggests a possible approach to this concern.

### **The need for quantitative evidence**

As driven by the three research questions asked at the beginning, this study collects narratives about the mobile technology using behaviors by both the young adults and the mature adults, the tablet use for learning by the mature adults, and the concerns and suggestions of the mature adults for tablet-assisted learning. Accordingly, the research findings are presented mainly as text, tables and figures, which are largely descriptive and imply a limited degree of external reliability and generalizability. Therefore, quantitative inquiry in this regard is more than needed, which ideally should be a follow-up large-scale



survey that focuses on substantiating the existence or non-existence of age-related differences in mobile learning.

### **Conclusion**

It takes a long way for both a technology and a human being to mature, and the interaction between these two has always been interesting and relevant to adult education as a field of study and practice. When this world sees technology evolving at a speed of light and information growing with a magnitude of an universe, every bit of learning effort made by a human being can be easily routed to an Internet-capable gadget. Nowadays, tablet, smartphone or emerging mobile devices alike are expected to deliver instant information, quick answers, and never failing connectivity, and therefore are assumed by many to be important facilitators for learning. This inquiry into twelve adult learners' mobile learning behaviors, however, seemingly tells another story. Noticeably, there are mature adults who rationalize or even deliberately underuse their mobile devices even though they highly acknowledge the role of those devices in delivering utility, convenience and efficiency. Underlying such rationalized use of technology is an adherence to essential meanings, true attachments and authentic involvements, which the mature adults find largely absent in the virtual world that the handheld gadgets can easily conjure up. When a meaningful interaction between the learner, the technology and the society is always desirable in an ideal world of learning, the mobile learning reality as partially captured in this study requires the academy, the industry, and the society to, first of all, sincerely listen to the needs, the concern and the advice from the learner, with the adult learner undoubtedly being one of the most experienced, most insightful and most critically engaged camps.

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## Appendix 1: Sample Consent Form

I understand that I have been asked to participate in a research being conducted by Jun Luo (Tel.: , email: ) from Department of Education of Concordia University leading to the writing of her M.A. thesis under the supervision of Dr. Adeela Ashad-Ayaz from Department of Education of Concordia University (Tel: , Ext. , email: ).

### A. PURPOSE

I have been informed that the purpose of the research is to explore the adult population's digital use patterns and examine their experience of using tablets for learning purposes.

### B. PROCEDURES

I understand that I am going to be interviewed by the researcher. I am informed that the interview would take forty-five to sixty minutes to complete.

### C. RISKS AND BENEFITS

I understand that there is no risk if I decide to participate or not participate in the research. My participation, however, will contribute to a better understanding of how the adult population of the twenty-first century make use of mobile technologies for learning purposes.

### D. CONDITIONS OF PARTICIPATION

- I understand that my participation in the study is anonymous and will be treated as CONFIDENTIAL (i.e., the researcher will possibly know, but will not disclose my identity).
- I understand that I am free to choose not to answer any question(s) I do not feel comfortable with.
- I understand that I am free to withdraw my consent and discontinue my participation at anytime by notifying the researcher in oral or written format, without any negative consequences arisen therefrom
- I understand that the data from this study may be published.
- I understand that I have the right to request a summary of the research findings once the project is concluded. I can also access the thesis in Spectrum – Concordia University's open access reference for thesis and dissertation.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) \_\_\_\_\_

SIGNATURE \_\_\_\_\_

If at any time you have questions about the proposed research, please contact the study's Principal Investigator Jun Luo from Department of Education of Concordia University (Tel.: email: ) or the study's Faculty Supervisor Dr. Adeela Arshad-Ayaz from Department of Education of Concordia University (Tel.: , Ext. , email: )

If at any time you have questions about your rights as a research participant, please contact the Research Ethics and Compliance Advisor, Concordia University, 514.848.2424 ex. 7481  
ethics@alcor.concordia.ca

**Note:** *Some contact information is intentionally left blank in this sample document.*

## Appendix 2: Sample Interview Protocol

**Q 1. Would you mind telling me which category below includes your age?**

- A. 18-24      B. 25-32      C. 33-40      D. 40-49      E. 50-59      F. 60 or older

**Q 2. What is the highest level of education that you have completed or will complete in 2014?**

**Q3. Would you please briefly describe your current employment status**

**Q 4. What electronic devices do you own? (eg. cell phone, smart phone, PC, laptop, tablet, e-reader, or other?)**

**Q 5. Do you prefer paper to electronic screen when reading? Can you give an example?**

**Q 6. Do you prefer pen or pencil to keyboard when writing? Can you give an example?**

**Q 7. Do you prefer pictures to words when expressing yourself or explaining something to others? Can you give an example?**

**Q 8. How would you rate your ability of multitasking, especially when using mobile devices? Can you give an example?**

**Q 9. In what ways mobile devices help you save time?**

**Q 10. How comfortable do you feel when using mobile devices to communicate with people?**

**Q 11. How would you rate the level of ease to use tablets?**

**Q 12. Would you please describe your experience of learning how to use a tablet for the first time?**

**Q 13. In your experience, have you used some e-reading apps on tablets? And how do you feel about that experience?**

**Q 14. In your experience, have you used some reference apps on tablets? And how do you feel about that experience?**

**Q 15. In your experience, have you used some note-taking apps on tablets? And how do you feel about that experience?**



- Q 16. In your experience, have you used some productivity apps on tablets? And how do you feel about that experience?**
- Q 17. In your experience, have you used some web publishing apps on tablets? And how do you feel about that experience?**
- Q 18. In your experience, have you used some instant messaging apps on tablets? And how do you feel about that experience?**
- Q 19. In your experience, have you used some social networking apps on tablets? And how do you feel about that experience?**
- Q 20. About what percentage of your tablet use activities do you consider to be a learning experience?**
- Q 21. How would you rate the overall utility of tablets for learning purposes?**
- Q 22. What are your biggest frustrations, difficulties or concerns when using tablets for learning purposes?**
- Q 23. What are your suggestions on how to improve the educational use of tablets in daily life?**