UNIVERSITY OF CALGARY

Study of Adult ESL M-learning

by

Rong Hu

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE

GRADUATE DIVISION OF EDUCATIONAL RESEARCH

CALGRAY, ALBERTA

June, 2011

UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Study of Adult ESL M-learning" submitted by Rong Hu in partial fulfillment of the requirements for the degree of Master of Science.

Supervisor, Dr. Qing Li, Graduate Division of Educational Research

Dr. Ian Winchester, Graduate Division of Educational Research

Dr. X-Jie (Jay) Yang, Department of Germanic, Slavic and East Asian Studies

June 17, 2011

Date

Abstract

This qualitative case study attempts to explore how to use portability of mobile devices in second language learning, especially for Chinese adult English learners.

After reviewing the literature and analyzing first interview data with five participants on their previous experiences and thoughts about learning English, a Mobile English Listening System was designed to help learners improve listening/speaking skills, which includes approximately 11 hours of audio learning materials selected from the Internet and book stores. Participants were invited to experiment with this system and share their learning experiences, problems and thoughts three/four months later. The second interviews focused mainly on understanding the quality of the specific listening materials and the process of mobile listening. In the suggestions section of this study, more general suggestions were provided on adult ESL M-learning, including the way of approaching technology-enhanced language learning and integrating more powerful mobile technologies than just using them as delivering mediums.

TABLE OF CONTENTS

Abstract ii

Table of Contents iii

List of Figures vi

List of Abbreviations vii

CHAPTER ONE: INTRODUCTION 1

Introduction 1

Research Questions 2

Theoretical Framework 3

Significance of the Study 4

Organization of the Study 4

CHAPTER TWO: LITERATURE REVIEW 6

Literature Review in SLA 6

Concepts and Factors Involved in SLA Process 6

Other Relevant Theories and Practices in SLA 22

Literature Review on the Application of Advanced Educational Technologies 26

History of Educational Use of Computers and Corresponding Theoretical Perspectives and Practices in CALL 27

Mobile Learning 29

Critical Review of Some Research on ESL M-learning 31

Summary of Literature Review 34

CHAPTER THREE: Methods 35
Research Design and Procedures 35
Qualitative Case Study 35
Participant Sampling 37
Interview Questions 37
Data Collection and Analysis 38
Considerations on Ethics and Validation 39
CHAPTER FOUR: FINDINGS 41
Needs Analysis 41
Findings of the First Interviews 41
Discussions of Needs Analysis 48
Summary on Needs Analysis 58
Mobile English Listening System 60
Purpose of the Mobile English Listening System 60
Features of the Selected Mobile Listening Materials 61
The Second Interviews 71
Findings of the Interviews 71
Discussions of the Themes 77
Summary 86
CHAPTER FIVE: SUGGESTIONS ON ADULT ESL M-LEARNING 87
The Way of Approaching Mobile English Learning 87
Suggestions on Adult ESL Learning through
More Powerful Mobile Devices 90
As a Medium to Deliver Learning Materials and Enhance Input 92

As a Processor to Help Learners Process Information and Construct Knowledge 95
As an Environment to Build Learning Community 99
Limitations of the Study 101
REFERENCES 103
APPENDIX A: Mobile English Listening System 109
APPENDIX B: Interview Protocol 116

List of Figures

Figure 1: Framework for the Second Language Acquisition Process 7

Figure 2: Input Enhancement (Examples) 9

Figure 3: The Function of Negative Evidence 11

Figure 4: Classification of Mobile Technologies 30

Figure 5: Mobile English Listening System 61

Figure 6: The Way of Approaching Mobile English Learning 87

List of Abbreviations

CALL ..... Computer Assisted Language Learning

ESL ..... English as a Second Language

L1 ..... First Language

L2 ..... Second Language

M-learning ..... Mobile-learning

NS ..... Native Speaker

NNS ..... Non-Native Speaker

SLA ..... Second Language Acquisition

SMS ..... Short Messaging Service

VOA ..... Voice of America

CHAPTER ONE: INTRODUCTION

1.1 Introduction

All around the world, we are witnessing our society growing increasingly connected and mobile, with the development of a variety of information sources and communication technologies available almost everywhere. Rheingold (2002) labeled this change "the next social revolution" (p. iii) in human society – transforming cultures and communities in the age of instant access.

Educators are not ignoring the reality that mobile devices are already finding their way into learners' pockets; they also desire that educational practice include these technologies to productively enhance students' learning. There is considerable interest in exploiting the capabilities and characteristics of mobile technologies to enable new forms of learning (Naismith, Lonsdale, Vavoula & Sharples, 2004).

My interest of this study is to use mobile technologies in the second language learning, especially for Chinese adult ESL (English as a Second Language) learners.

I am interested in this subject because I am an ESL learner. And along with many of my friends, we are still struggling to improve our English in order to better integrate into Canadian society even after living in Canada for many years. We all have over ten years of formal English language education at school in China (mostly a structured method), but none of us feel the knowledge we learned at school is adequate in real life after we came here. Considering the time and effort we've made on studying English, our learning gains seem to suggest that there is still something that needs improvement in our English learning methods. The emergence of advanced communication technologies has provided many potential educational affordances. But in order to get benefit from advanced technologies, we need to identify our problems in learning first, and then explore the possible ways of using technologies to address them.

In this study, I explore how to use affordances of mobile technologies to complement the existing second language learning practices, and how they work to facilitate the learning.

1.2 Research Questions

The primary purpose of this case study is to explore and describe the educational affordances and potentials of mobile technologies for adult ESL learners. In the research, the mobile technology is generally defined as using devices with personal and portable features such as mobile phones, MP3 players, radios and so on.

This study focuses on the following research questions:

1). How can educators use the portability of personal mobile devices to help adult ESL learners?
2). How does the portability of mobile devices facilitate adult ESL learning?

These questions guide the subsequent case study, in which I explore and exemplify a detailed approach to utilizing specific features (portability affordance and voice function in this case) of the common mobile devices the participants already had (e.g., MP3 players, radios, etc.). The study includes two interviews. During the first interviews, participants provided data on their previous experiences and thoughts about learning English. Based on learners' needs analysis, a Mobile English Listening System, which included approximately 11 hours of audio learning materials, was designed to help learners improve listening/speaking skills by using the portability of personal mobile devices. Participants were invited to experiment with this system and share their learning experiences, problems and thoughts three/four months later. The second interviews focused mainly on understanding the quality of the listening materials and exploring the way of using mobile technologies to improve learners listening/speaking. By studying this case, I tried to further provide more general suggestions on other ways to use the portability of personal mobile devices with more powerful functions to help adult ESL learners.

1.3 Theoretical Framework

The study uses constructivist theory as its framework, which places students at the center of the learning experience and sees learning as an active process in which learners construct their knowledge based on their prior knowledge and current information (Bruner, 1966).

In this study, the first interviews served as a needs analysis which gave rise of the design of my Mobile English Listening System. This conforms to the constructivist learner-centered learning theory. During the second interviews, I focused not only on the findings of the quality of listening materials but also on the process of mobile-learning (m-learning) in which learners actively build their knowledge and their prior knowledge (e.g., their first language) plays an important role. This endorses cognitive constructivists who emphasize the individual's mental construction.

Crook (1996) characterized research in computer-based learning context as the "input-output designs" (p. 9), used in m-learning, which means to expose learners to some mobile learning environment, and sometime later, do an outcome test of understanding to focus either on the language performance of students, or their motivation. Grounded on the constructivist framework, in this study, I tried to go beyond this common pattern of input-output research. I invited the participants to experience the learning through new technologies and materials available on the Internet or bookstore. Then we discussed methods of embedding it into our daily life (informal learning) and lifelong learning. The aim is to affect their attitude and beliefs that would have long-term influence (hopefully lifelong influence). This effort of focusing on learning methods, learners' attitude and beliefs is also based on one of the important cognitive constructivist teaching principles – "Place thinking and learning responsibility in students' hands to foster ownership" (Bonk & Cunningham, 1998, p. 33).

1.4 Significance of the Study

For adult ESL learners, this research can help them reflect on and better understand their learning methods and beliefs. Such information may help their future learning in a new environment, thereby benefiting from fast-growing advanced technologies.

For mobile educational application developers, this research can enrich their understanding of the learning process, and bridge the gap between them and the end-users (i.e., learners). Therefore, they can apply technologies to develop useful applications to address specific learning needs or even design more function in new devices to help learners.

For researchers, this research demonstrates an attempt guided by constructivist learner-centered theory and to move beyond the common input-output research design. This work adds a new voice to the dialogue on the topic of m-learning. That is, based on the critical review of some research on English m-learning, this study illustrates my method of designing m-learning, which suggests clearly determining the overlap of technical affordances and effective learning activities.

1.5 Organization of the Study

The remainder of the thesis presents the entire study. Chapter two provides literature review, which includes theories and research in second language acquisition (SLA), and overview of the literature on the relevant application of technologies, especially critical review of some research on English m-learning. Chapter three describes the methods (research design and procedures), justifying the choice of qualitative approach, exemplifying some interview questions in order to explore the research questions, the procedures for participant sampling, data collecting, managing and analyzing, and the considerations on ethics and validation. Chapter four describes the data analysis of the study, including the presentation of the findings in the first interviews and discussions of needs analysis of my Mobile English Listening System design, the description of the Mobile English Listening System, and findings and discussions of the second interviews

after experimenting with the system. Chapter five provides more general suggestions on adult ESL m-learning, including the method of designing, suggestions on using potentials of more powerful mobile technologies to enhance learning, and the limitations of this study.

CHAPTER TWO: LITERATURE REVIEW

This chapter briefly reviews related literature, which includes: the theoretical and empirical research in second language acquisition (SLA) and relevant application of technologies.

2.1 Literature Review in SLA

This section reviews the literature in SLA from the pedagogical perspective. I organized the relevant concepts and factors into a framework for SLA process and briefly reviewed other relevant theories and practices. My primary concern here was some of the underpinnings that are involved in SLA process – what they are and what purpose they serve. Thus, insights could be gained into the conditions for the SLA.

2.1.1 Concepts and Factors Involved in SLA Process

There are some important concepts and factors involved in the SLA process. I schematized those relevant to this study in the following diagram (Figure 1), which served as a logic organizer.

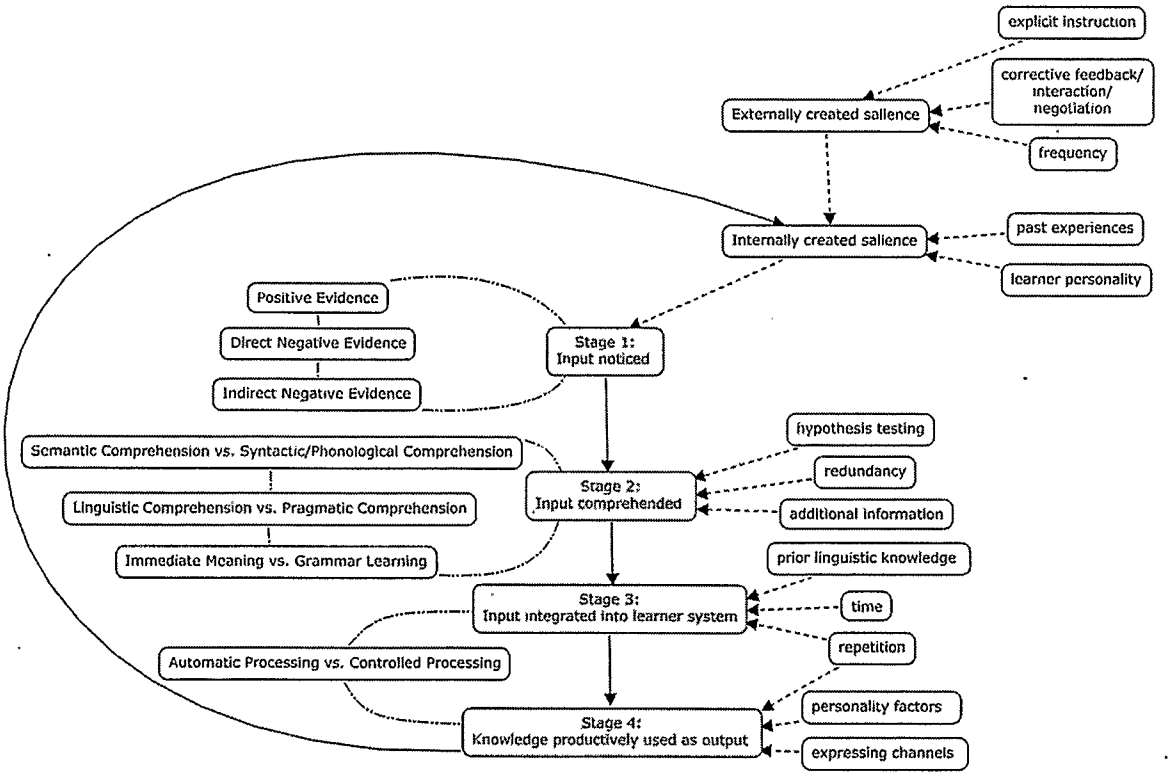

Figure 1: Framework for the Second Language Acquisition Process

Four stages were proposed to account for the reiterating cycle of learning process: "Input noticed", "Input comprehended", "Input integrated into learner system" and "Knowledge productively used as output". The regular line with an arrow illustrates the conversion of each stage. The concepts involved in each stage are linked on the left with dotted line. The factors that play important roles in every stage are connected on the right with dotted line and an arrow.

The following is the detailed explanation of related concepts and factors in each stage.

"Stage 1. Input noticed"

(1). Three Types of Evidence

From a theoretical perspective, Gass (1997) categorized three kinds of evidence available for learners in the process of forming and testing linguistic hypothesis at the stage of noticing the input data – "Positive Evidence", "Direct Negative Evidence" and

"Indirect Negative Evidence", which I schematized as three concepts related to Stage 1 in Figure 1.

① Positive Evidence comprises "the set of well-formed sentences to which learners are exposed" (Gass, 1997, p. 36). It can be either authentic or modified (simplified or elaborated).

② Direct Negative Evidence refers to "the type of information that is provided to learners concerning the incorrectness of an utterance" (Gass, 1997, p. 37). This might be in the form of explicit information (e.g., that's wrong, you should say...) or implicit information (e.g., pardon me?).

③ Indirect Negative Evidence is an "indirect means of letting the learner know that a feature is not possible because it is never present in the *expected* environment" (Plough, 1994 in Gass, 1997, p. 38), based on the innately specified principles and parameters of universal grammar, the first language or other languages known, etc.

If the grammar of the learner's native language is a subset of the target language, according to the assumption of native-target language similarity, the learner may select the more restricted grammar. Then the positive evidence alone would immediately allow him/her to modify his/her hypothesis, because different grammar in the target language (superset) would be heard or read. Then what if his/her L1 (First Language) is a superset? In this case, his/her assumption is less restricted. Trahey and White (1993) claimed that it takes negative evidence to show L2 (Second Language) ungrammaticality when the L1 counterpart is grammatical. That is to say, in some instances, positive evidence alone is not sufficient for the development of a complete grammar and negative evidence is also necessary for second language acquisition.

(2). "Externally created salience" vs. "Internally created salience"

These two factors were schematized as related to Stage 1 in Figure 1.

As the first step to learning, a learner must notice something salient in input data. Bardovi-Harlig (1987) defined salience as "the availability of data" (p. 388). Sharwood

(1991) coined a term "input enhancement" (p. 118), referring to the process by which language input becomes salient to the learner. He provided the following example (Figure 2) to illustrate this concept.

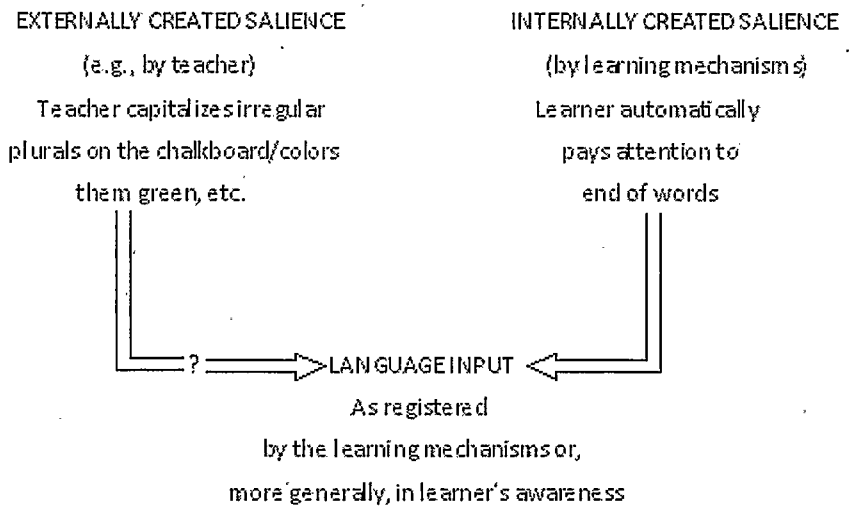

Figure 2: Input Enhancement (Examples) (Sharwood, 1991, p. 121)

This figure illustrates with examples that input enhancement can be created internally by the learner or be generated externally. It also points out that not all externally created salience results in noticed input (which is represented by a question mark in the diagram). Ultimately, it is the learner who is selecting what is and not noticed. This is the reason why in Figure 1 I drew "Internally created salience" as the direct factor of Stage 1, while I drew "Externally created salience" as a factor that helps create salience internally.

The common factors that can create external salience include "explicit instruction", "corrective feedback/interaction/negotiation" and "frequency", which were schematized as factors related to "Externally created salience" in Figure 1.

"explicit instruction"

Explicit instruction is a type of positive evidence, which can be either authentic or modified (simplified or elaborated).

It is frequently the case that the language addressed to non-proficient speakers differs from the language used when addressing adult native speakers. Modifications are thought to be strategies to aid the non-native speakers in understanding, to maintain a smooth, flowing conversation in which both parties participate. For example, speech is often louder, slower, and carefully articulated, vocabulary and syntax tend to be simple, sentences are shorter, and information is repeated...

Simplification may lead to better understanding by reducing the amount of information, and allowing more time for learners to process the available information appropriately. However, if the simplification removes much of semantic redundancy present in language, it may make it more difficult to understand (Issidorides, 1988). Parker and Chaudron (1987) further pointed out that simplifications resulting from discourse elaboration or modification of the conversational structure are more likely to result in comprehension than those simplifications at the linguistic level.

"corrective feedback/interaction/negotiation"

Corrective feedback/interaction/negotiation is a common form of negative evidence. When interpreting the results of the studies regarding the function of negative evidence, Gass (1997) suggested that we take it not to be an initiator of an immediate change, but rather as a catalyst that allows learners to begin to search the input for more exemplars so as to confirm or disconfirm the current hypothesis. She schematized the idea in Figure 3.

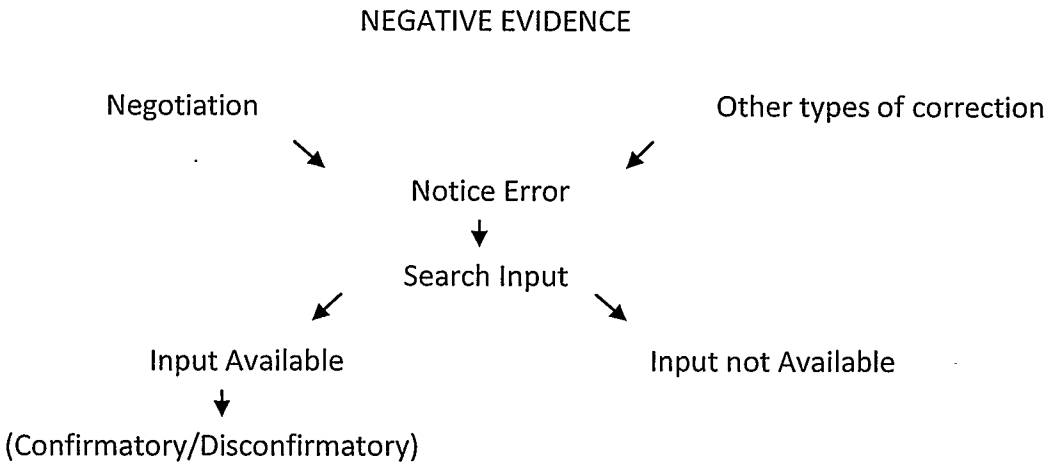

Figure 3: The Function of Negative Evidence (Gass, 1997, p. 144)

With this figure, Gass (1997) showed that negotiation of meaning may serve as a certain type of negative evidence. Learners who are provided with such information are initiated to search for additional confirmatory or disconfirmatory evidence, resulting in restructuring of linguistic knowledge if input is available. However, if additional input is not available, learners do not have the opportunity to obtain confirmatory or disconfirmatory evidence, and the learning will not take place.

Conversational interaction or negotiation of meaning is not a necessary condition but rather helps to increase the possibility of a greater amount of input becoming noticed and further processed. In this sense, conversation is not only a medium of practice; it is also the means by which learning takes place (Wagner-Gough & Hatch, 1975). Through interaction or negotiation, learners focus their attention on particular parts of the language and gain additional information about the language. This focus (or specific attention) primes language for later analysis and integration into learners' developing inter-linguistic system (Gass, 1997).

"frequency"

With regard to frequency, we all have the experience that something very frequent in the input is likely to be noticed. On the other hand, particularly at more advanced stages of learning, at which expectations of language data are well established, something

unusual because of its infrequency may stand out for learners (Gass, 1997). Thus, frequency directs learners' attentional resources to a particular bit of information.

Factors schematized in Figure 1 to be related to "Internally created salience" include "past experiences" and "learner personality".

"past experiences"

Past experiences influence the selection of noticed material, because during the process of apperception, newly observed qualities of an object are initially related to past experiences (Robinson, 1995).

"learner personality"

When considering the function of input, we must also include learner's individual personality. There are many learning style classifications. For instance, Gardner (1993) hypothesized seven types of intelligence which learners may have in different measure:

- plays with words (verbal-linguistic)
- plays with questions (logical-mathematical)
- plays with pictures (visual-spatial)
- plays with music (music-rhythmic)
- plays with moving (body-kinesthetic)
- plays with socializing (Interpersonal)
- plays alone (Intrapersonal) (Gardner, 1993 in Milton, 2002, p. 11)

Other important factors worthy to note regarding noticing input, are the information processing capacity of the human brain and input filters as introduced below.

It is uncontroversial that not everything that learners hear or read is utilized as they form their linguistic systems. Some data is excluded at the beginning of the input stage.

The human brain has a limited capacity for processing information. We are constantly overwhelmed by various sorts of external stimuli. By focusing attention on a limited and

hence controlled amount of data at a given point in time, we can select a set of data and allow them to go into our mind. Some bits of language are noticed in some way by the learner, because of some particular recognizable features. In other words, some input language data filter through to the learner and become apperceived input for further processing, as the learner recognizes that there is something to be learned – some knowledge gap needs to be filled, e.g., a mismatch exists between what is present in the input and his/her own construction of the target language (Gass, 1997).

However, this does not mean that second language learning cannot take place without awareness or attention; to be precise, attention and awareness are important but not the only factors (Gass, 1997).

There are other factors serving as input filters: alertness/readiness/willingness (including social distance, status, motivation, attitude, self-confidence, anxiety... aka affective filter) (Krashen, 1982; Schumann, 1976; Tomlin & Villa, 1994), orientation (including frequency, profession, presentation...) (Tomlin & Villa, 1994), time pressure (Gass, 1997), etc.

According to Krashen (1985), a low affective filter is crucial in language acquisition. High pressure and nervousness may block the input.

"Stage 2. Input comprehended"

Input must be decoded in some understandable way before it is usable for the development of the learner's system. Here, the emphasis should not be on comprehensible but on comprehended input because the process of comprehending depends on the learner, who controls the comprehensibility (Gass, 1997).

Most models of second language acquisition assume comprehension as a major component. Some stated it as central.

> people acquire second language only if they obtain comprehensible input and if their affective filters are low enough to allow the input 'in'. When the filter is 'down' and

> appropriate comprehensible input is presented (and comprehended), acquisition is inevitable. (Krashen, 1985, p. 4)

Krashen (1985) also pointed out explicitly that input containing structures that are way ahead of a learner's current knowledge is not useful.

(1). Different Levels of Comprehension

Input data can be comprehended on different levels, like I schematized as three groups of concepts related to Stage 2 in Figure 1 – "Semantic Comprehension vs. Syntactic/Phonological Comprehension", "Linguistic Comprehension vs. Pragmatic Comprehension", and "Immediate Meaning vs. Grammar Learning")

"Semantic Comprehension vs. Syntactic/Phonological Comprehension"

Cook (1996) noted that the ability to decode language for meaning (processing language to get the message) is not the same as code breaking, which refers to the determination of the nature of the linguistic system used for conveying meaning (processing language to get the rules). In other words, one can comprehend the language at the level of meaning (having an understanding of the general message); he/she might also understand the component parts of an utterance (having a deeper understanding of the syntactic/phonological relations or pattern represented). Generally, semantic comprehension is a prerequisite to syntactic comprehension. Although semantic comprehension is necessary, it does not guarantee syntactic comprehension (Gass, 1997).

"Linguistic Comprehension vs. Pragmatic Comprehension"

It is often the case that certain pragmatic behaviors (e.g., when and how to apologize, to compliment, to refuse) are learned late; native pragmatic behavior may persist even after many years of exposure to the target language despite fluency in all other linguistic areas. Gass (1997) claimed that the main reason is learners do not readily recognize these areas as differing cross-linguistically or cross-culturally. She pointed out that the

focus on these aspects at a detailed level of comprehension is also a prerequisite to their acquisition.

"Immediate Meaning vs. Grammar Learning"

Under time or conversational pressures, learners are often too absorbed by the goal of extracting meaning from what another is saying to put time or effort into the form of a conversation. That is, learners may comprehend language input data only for the immediate function of interpreting interlocutor's intention. Thus, some input may be comprehended only for the purpose of immediate meaning in the course of a conversational interaction, and may not be used for the purpose of learning – incorporating into learners' grammars (Gass, 1997).

(2). Possibilities of the Outcome of Noticed Input

Gass and Selinker (1994) outlined four possibilities of the outcome of noticed input. The factors I schematized as related to Stage 2 in Figure 1 are selected from the following explanation of these possibilities.

① Useful Input

If the learner has created a particular hypothesis about some grammatical form, on being confronted with input data, he/she may receive confirmation of the hypothesis and strengthen that knowledge (integration), or he/she may receive information that causes him/her to reject the original hypothesis. Then, the hypothesis is modified and waits further testing with additional information (Gass & Selinker, 1994).

In Figure 1, "hypothesis testing" was schematized as a factor related to Stage 2.

② Redundant Input

When the information contained in the input is already a part of the learner's knowledge base, it may also be used for rule strengthening, hypothesis reconfirmation, or contributing to automatic retrieval of information from one's knowledge base (the

knowledge base is developed through practice or repeated exposure to exemplars) (Gass & Selinker, 1994). In their study, Pica, Doughty and Young (1986) clearly showed that redundancy, in terms of exact as well as semantic repetitions, aided in the comprehension process.

In Figure 1, "redundancy" was schematized as a factor related to Stage 2.

③ Storage Input

If the learner has created a hypothesis about the input, but because there is insufficient evidence to determine the validity, the information may be put into storage, awaiting additional information to test the hypothesis (Gass & Selinker, 1994).

In Figure 1, "additional information" was schematized as a factor related to Stage 2.

④ Nonuse Input

The Learner makes no use of the input. This may be because he/she has not succeeded in comprehending it at a useful level or the information contained in the input is already incorporated into the learner's grammar. (Gass & Selinker, 1994)

"Stage 3. Input integrated into learner system"

Input material is further processed to be assimilated, incorporated and internalized into the learner's knowledge system/grammar.

(1). Two kinds of Processes in Language Processing

From psycholinguistic perspective, McLaughlin (1987) distinguished two processes in understanding language processing, which were schematized as a group of concepts related to Stage 3 in Figure 1 – "Automatic Processing vs. Controlled Processing".

> *Automatic Processing* involves the activation of certain nodes in memory every time the appropriate inputs are present. This activation is a learned response that has been built up through the consistent mapping of the same input to the same pattern

> of activation over many trials. Since an automatic process utilizes a relatively permanent set of associative connections in long-term storage, most automatic processes require an appreciable amount of training to develop fully. Once learned, an automatic process occurs rapidly and is difficult to suppress or alter. (McLaughlin, 1987, p. 134)
>
> *Controlled Processing* is not a learned response, but a temporary activation of nodes in a sequence. This activation is under attentional control of the subject and, since attention is required, only one such sequence can normally be controlled at a time without interference. Controlled processes are thus tightly capacity-limited, and require more time for their activation. But controlled processes have the advantage of being relatively easy to set up, alter, and apply to novel situations. (McLaughlin, 1987, p. 135)

One can move from controlled processing to automatic processing through repeated performance. That is, a particular task that initially requires a significant amount of control and processing capacity becomes through repeated trials so automatic that little attention and little processing capacity is involved. In second language acquisition, learners interact with the input, as they focus attention on those parts of the input that have not been automatized (Gass, 1997).

(2). Factors Related to Integrating Input

Factors schematized in Figure 1 to be related to Stage 3 include "prior linguistic knowledge", "time" and "repetition".

"prior linguistic knowledge"

Prior linguistic knowledge (including native language knowledge, other languages knowledge, existing second language knowledge, world knowledge, language universals, etc.) is important in further processing input because it forms the basis for analysis.

Learners need some sort of "anchor" (Gass & Selinker, 1994, p. 483) on which to ground new knowledge.

"time"

Time is also a factor that determines whether or not a particular comprehended input will result in integration. There are numerous instances in free conversations where comprehension does take place but the time demands of a conversation do not allow retention of information. Gass and Varonis (1989) suggested there seemed to be some sort of permeation time during which a learner may have contemplated the linguistic material, then incorporate them into language knowledge base.

"repetition"

It is noteworthy that integration is not necessarily a one-time affair. There are different levels of analysis and reanalysis from storage into the grammar and within the grammar itself as part of integration.

At this stage, different levels of analysis differentially affect integration. Gass (1997) maintained that an analysis at the level of meaning may be less important than an analysis at the level of morphology, lexicon, or syntax for intake and eventual integration of linguistic information.

We can also find the important role of repetition in the previous description of moving from controlled processing to automatic processing.

"Stage 4. Knowledge productively used as output"

(1). Active Role of Output in Acquisition

Input alone is not sufficient for acquisition. Many researchers emphasize the importance of output in the learning process. In Figure 1, I schematized "Automatic Processing vs. Controlled Processing" as a group of concepts linked to Stage 4 to show one perspective

supporting this idea. And the following are more comprehensive arguments on this issue.

In her research, Swain (1985) suggested the crucial role of output in the development of a second language. She compared results on a number of different measures of sixth-grade children in a French immersion setting with sixth-grade native French-speaking children, and found the lack of second language development by immersion children even after years of academic study in that second language. She hypothesized that what was lacking in their development as native-like speakers of French was the opportunity to use language productively as opposed to using language merely for comprehension.

Traditionally, output, or production, has been viewed as a way of practicing what has previously been learned, to aid learners in internalizing the knowledge. For example, in the language class, learners study grammatical rules and then practice these rules within a conversational setting; the conversational interactions are considered only as a means of reinforcing the grammatical rules somehow acquired by learners.

Swain (1985) explicitly pointed out that output or language use could be part of the learning mechanism itself. She introduced the notion of "pushed" (p. 248) output, which means learners are pushed or stretched in their production as a necessary part of making themselves understood. In order to convey the message more precisely and coherently, they might modify a previous utterance or they might try forms that they had not used before.

Swain (1985) also noted the crucial role output plays in forcing a syntactic rather than solely a semantic processing of language. When the individual is listening or reading, he/she might gain a general understanding of the message by relying on other aspects of the conversational situation, instead of by understanding the language-specific syntax of the target language. Sometimes, little knowledge, other than the meanings of the basic words and something about real-world events, is sufficient. When speaking or writing, however, the leaner is forced to put the words into some syntactic structure.

Production then may "move the learner from a purely semantic analysis of the language to a syntactic analysis of it" (Swain, 1985, p. 252).

According to Swain and Lapkin (1995), the essence of the second language learning process can be depicted as following: Output provides learners with the opportunity to produce language and gain feedback, which, by focusing learners' attention on certain particular aspects of their speech, may lead them to notice either a mismatch between their speech and that of the interlocutors or, a deficiency in their output. Noticing, then, leads to hypothesis testing and reassessment, which may be an on-the-spot analysis or longer term complex thinking about the issue. That latter may be strengthened by gathering additional information through a variety of sources (e.g., input, direct questioning, grammar books, dictionaries, etc.).

In addition, from the information processing perspective, repeated, consistent and successful mappings (i.e., practices) of grammar to output result in automatic processing (Loschky & Bley-Vronman, 1993).

Therefore, output is not merely a forum for practice; it may play a significant role in the second language acquisition. Gass (1997) categorized its roles as hypothesis testing, receiving feedback, developing automaticity in production and forcing a shift from meaning-based processing of the second language to a syntactic mode (or grammatically based processing).

So, output is not the end point of language acquisition. Output can bring certain forms to learners' attention; forms that might otherwise go unnoticed. It serves as an important function to help learners recognize their mismatch on linguistic forms, make later relevant input salient and therefore effective. Actually, output may initiate a new round of meaningful learning cycles as illustrated in Figure 1.

(2). Factors Related to Output

Factors schematized in Figure 1 to be related to Stage 4 include "repetition", "personal factors" and "expressing channels".

"repetition"

Just like in Stage 3 from the psycholinguistic perspective, we see that repetition plays an important role in moving from controlled processing to automatic processing. We can also find the similar important functions of repetition in the stage of producing.

"personal factors" and "expressing channels"

It is worthy to note that output is not identical to one's grammar. Output may be limited by the access that one has to his/her knowledge base or, limited by representing one's language knowledge by certain forms of output. For instance, personality factors such as confidence in one's ability sometimes are determinants. There is also a difference in an individual's ability to use different channels to express linguistic information (Gass, 1997).

In the following chapter on my research method, I discuss my decision on evaluation and measurement of language knowledge in this study.

# # #

In summary, the second language acquisition process is a reiterating cycle, from noticing input to productively using knowledge as output. Output is not the end point. It may initiate a new round of meaningful learning cycles by enhancing input data internally.

Based on the assumption of native-target language similarity, positive evidence (such as explicit instruction of well-formed sentences) alone is not sufficient for the development of grammar completely. Negative evidence (including direct and indirect negative evidence) is also necessary for second language acquisition.

The learners select what is and what is not noticed and let input data filter through for further processing. In addition, the learners' personality, prior knowledge and past experiences are all important factors which influence the second language acquisition process.

Learners need different levels of comprehension, analysis and processes, to keep advancing to higher levels in order to use the second language naturally and automatically.

2.1.2 Other Relevant Theories and Practices in SLA

In this sub-section, I introduce some other relevant theories and practices in SLA which were not synthesized into the previous logic organizer.

(1). Discussions on the Critical Period Hypothesis

For most adult learners, it appears that "automatic acquisition from mere exposure to a given language seems to disappear" (Lenneberg, 1967, p. 176). So Lenneberg proposed the critical period hypothesis, which believed that our brain lost cerebral plasticity after puberty, thus second language acquisition more difficult for adults (Lenneberg, 1967).

Many researchers challenged Lenneberg's critical period hypothesis. They pointed out that neural cells responsible for higher-order linguistic processes develop with age, and adult learners' self-directedness, life experience, independence and motivation provide more advantage for second language learning (Schleppegrell, 1987). Walsh and Diller's research in neurology even demonstrated that adults have superior language learning capabilities in many important respects (Walsh & Diller, 1978).

Lately, it is believed that there exist several critical periods. For example, native-like pronunciation is easily acquired within months of birth, while vocabulary building can be developed continuously for adults (Milton, 2002).

(2). Krashen's Monitor Hypothesis

Krashen (1982) assumed that second language learners have two independent means of developing knowledge of a second language: "language *acquisition*" (p. 10) (the acquired system: through a subconscious process during repeated exposure) and explicit "language *learning*" (p. 10) (the learned system: through conscious process such as rules, grammar study). The acquired system contributes to generate utterances for communication because in producing language, learners focus on meaning, not on form. The learned system serves as an inspector of the acquired system. It checks the correctness of the utterance against the knowledge in the learned system.

(3). Studies on the Role of Learner's First Language

Levy, McVeigh, Marful & Anderson (2007) studied the phenomenon of first-language attrition, which means that after immersion in a foreign language, speakers often have difficulty retrieving their native-language words. Their findings supported a new view on the causes of this phenomenon and suggested that these lapses for native-language words may reflect an adaptive role of inhibitory control in hastening second language acquisition. Their results supported the idea that adult learners need to resist their first language interference to help acquire a second language successfully.

In China, Zhong (2005) proposed a special activity to improve adult ESL learners' English language listening skills. Unlike in traditional audio classroom where comprehension practices are performed to check students' understanding of the listening materials, in his class, students need to write down each word they are hearing without thinking its meaning. By doing so, learners are trained to consciously direct their attention on linguistic forms (the sound and spelling of English) instead of immediate meaning. It is also an effective method to insulate learners from the interference of learners' native language while listening; because they have no further attentional resources to match the corresponding Chinese definition of the English word due to the limited capacity of our brain.

This activity may be more important for learners whose first language is visual like the Chinese language. Chinese letters are based on form in nature and maintain their original pictographic quality. Usually, there is no connection between the spelling and the sound, therefore Chinese students are not used to this kind of connection. Zhong invented a special record player, which can repeat the select section of recording over and over again without rewinding and replaying regular cassette tapes. Thus learners can play the section many times until they write down it and go on.

(4). Research on Learning Activities

① Learning with Eyes vs. Learning with Ears

Researchers found that different modes of channel influence the internal processes of knowledge representation and acquisition (Mandl & Levin, 1989). In Beagles-Roos & Gat's (1983) cross-media comparison of television and radio study, the elementary students' recall of details of a story was improved with television (combined use of audio and visual presentations), recognition of expressive language was facilitated by radio (audio presentation), whereas picture sequencing was augmented by a television (visual) presentation. In other words, children recall sounds and expressive language from the audio channel and retrieve visual details from the visual channel.

② Regarding Conversation

Chun, Day, Chenoweth, and Luppescu (1982) reported relatively little explicit feedback in free conversations between native and non-native adult speakers whose fluency in English ranged from beginning to advanced, in varying circumstances. Later, Day, Chenoweth, Chun, and Luppescu (1984) collected data from eleven ESL students at the English Language Institute at the University of Hawaii at Manoa (who were advanced ESL learners) and nine ESL students at Hawaii Pacific College (who were beginning/intermediate learners). They noted that of 1,595 student errors in their corpus, only 117 (7.3%) were singled out for corrective feedback by native speaker interlocutors.

It is not difficult to understand, because directly stating that someone is wrong may cause more or less social awkwardness, especially for adults who are not familiar with one another. They are more concerned that the conversation proceeds in a smooth fashion.

Even for children, Brown and Hanlon (1970) pointed out that the explicit approval or disapproval of their utterance was not dependent on syntactic well-formedness (syntax or morphology) but rather on the semantic truthfulness of their speech.

More commonly, the frequent feedback we get during natural conversation is expressions of non-understanding. They do not provide information that is sufficiently specific to inform us where exactly an error has been made. Is the failure in communication the result of incorrect syntax, phonology, morphology, or vocabulary? They also do not indicate what to do to correct the error.

It is often assumed that being a native speaker confers status on an individual and that the native speaker therefore dominates a conversation with a non-native speaker. Dominating a conversation limits the non-dominant party's right to talk (Zuengler, 1989).

On the part of non-native speakers, when we find ourselves engaged in a conversation about unfamiliar subjects with native speakers. We know beforehand that little will be understood. In such instances, we may do nothing more than provide minimal feedback to the native speakers so as not to appear rude. Even though non-understandings are frequent, it is uncomfortable to be responsible for continuous interruptions.

In many instances, particularly in conversations involving non-native speakers, the difficulties, even when recognized, rarely are resolved on the spot. Negotiation occurs when there is some recognized asymmetry between message transmission and reception, and when both participants are willing to attempt a resolution of the difficulty (Varonis & Gass, 1985).

In reality, there are a number of ways in which a conversational incongruity can be handled as the following indicates. Learning takes place during a communication task where the participants try to solve communication problems rather than to keep conversations going (Gass, 1997).

- It can be ignored, possibly because further exploration could be perceived as rude or as face threatening to one's interlocutor (due to the implication of poor language abilities as the cause of the lack of understanding).
- It can be put into storage, with a hope of later understanding, either during the course of the conversation when more information becomes available or later upon further reflection of what the conversational partner could have meant.
- With particular importance for non-native speakers, it can also be commented on with the hope of clarification. It is this type of exchange that is labeled negotiation, and this type of exchange has more significance for second language acquisition (Gass, 1997).

However, Aston (1986) warned that tasks which promote negotiation might result in language that is frustrating to produce and as a result is error-laden. Because negotiation does not always result in correct forms, it may result in pidginized varieties.

# # #

So far, I have reviewed the relevant literature in SLA. My research design and data analysis were developed by the above literature. In the next section, I review the literature on the relevant technologies and define the boundary of m-learning in this case study.

2.2 Literature Review on the Application of Advanced Educational Technologies

This section reviews the literature on the relevant application of advanced technologies, which includes a brief review of the history and application of computers and the

development of theoretical perspectives and practices of CALL (Computer Assisted Language Learning), overview of mobile learning (m-learning), and critical review of some research on ESL m-learning.

2.2.1 History of Educational Use of Computers and Corresponding Theoretical Perspectives and Practices in CALL

My research was designed using the most common mobile devices the participants already had. So it focused on utilizing limited specific features (voice function and portability affordance). By studying this case, I attempted to provide more general suggestions on how to apply the potential affordances of more powerful mobile devices. Therefore, it is necessary to review the shift of theoretical perspectives and development of generally advanced educational technologies used in SLA as well.

Crook (1996) made a review of computer-based educational practice/activities. He categorized four prevailing metaphors of computer use – tutorial, construction, simulation and toolbox metaphor.

Corresponding roughly to Crook's (1996) metaphors, Kern & Warschauer (2000) described the history of computer-assisted language teaching and the shifts in theoretical perspectives on language learning and teaching as structural, cognitive and socio-cognitive framework.

(1). Tutorial Metaphor and Structural Framework

The computer-as-tutor metaphor uses the computer as a teacher who initiates (asking questions to which he/she knows the answer), the student responses and the teacher evaluates (delivering evaluative feedback) (Crook, 1996).

The earliest computer assisted language learning (CALL) programs, consisting of grammar and vocabulary tutorials, drill and practice programs, and language testing instruments, strictly followed the computer-as-tutor model. Developed originally for mainframe computers in the 1960s and 1970s, though still used in different variations

today, these programs were designed to provide immediate positive or negative feedback to learners on the formal accuracy of their responses. This was consistent with the structuralist approach which emphasized that repeated drilling on the same material was beneficial or essential to learning (Kern & Warschauer, 2000).

(2). Construction Metaphor, Simulation Metaphor and Cognitive Framework

The computer-as-pupil metaphor means students construct new understanding through their exploratory activity in a meaningful environment created by the computer. In other words, the students teach computers (programming it) to do something in a microworld environment. Students gain new insights into their own thinking process through learning to program (Crook, 1996).

The computer-as-simulation metaphor means that students have some control over the operating parameters of a given domain of knowledge in a simulated system (macrocontexts) (Crook, 1996).

In line with cognitive/constructivist views of learning, the next generation of CALL programs tended to change agency to the learner. In this model, computers were seen as things to be controlled by, rather than controlling learners. The computer provided tools and resources, but it was up to the learner to do something with these in a simulated environment. The computer environments provided opportunities for problem solving and hypothesis testing, allowing learners to utilize their existing knowledge to develop new understandings (Kern & Warschauer, 2000).

(3). Toolbox Metaphor and Socio-cognitive Framework

Computer-as-toolbox metaphor describes that computers provide a toolbox to serve a wide range of human purposes (Crook, 1996).

As Crook (1996) pointed out, computer activities based on either a tutor or pupil metaphor potentially distance the teacher from what students are doing individually and autonomously, and can thus compromise the collaborative nature of language

learning. The computer-as-toolbox metaphor emphasizes the role that computers can play as mediational tools which shape the ways we interact with the world (e.g., accessing and organizing information through databases, spreadsheets, and word processors). Nowadays, computer networking allows another important extension of the computer-as-tool, in which it facilitates access to other people as well as to information and data. That is to say, with socio-cognitive approaches to CALL, learners can go beyond interacting with computers to interacting with other humans via the computer. The basis for this new approach to CALL lies in both theoretical and technological developments. Theoretically, there has been a broader emphasis on meaningful interaction in authentic discourse communities. Technologically, there has been the development of computer networking, which allows the computer to be used as a vehicle for interactive human communication.

In their predictions, Kern & Warschauer (2000) stated the computer can play multiple roles in language teaching. It originated on the mainframe as a tutor that delivered language drills or skill practice. With the advent of multimedia technologies on the personal computer, it served as a space in which learners can explore and creatively influence microworlds. And with the development of computer networking, it now serves as a medium of local and global communication and a source of authentic materials. This multiplicity of roles has taken CALL far beyond the early electronic workbook variety of software that dominated the second and foreign language marketplace for years, and has opened up new avenues in foreign language learning – to provide alternative contexts for social interaction and to facilitate access to existing discourse communities, even the creation of new ones.

2.2.2 Mobile Learning

My overview of mobile learning includes classification of mobile technologies and their educational affordances.

Naismith et al. (2004) classified the range of mobile technologies on the two dimensions of personal vs. shared and portable vs. static, as outlined in the following figure (Figure 4).

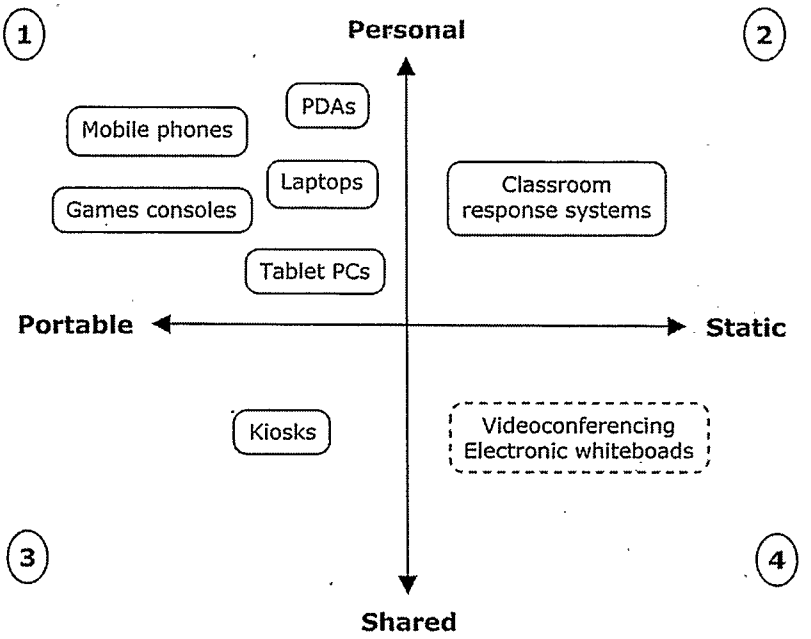

Figure 4: Classification of Mobile Technologies (Naismith et al., 2004, p. 8)

Quadrant ① shows devices that are both portable and personal. These include most common mobile technologies. These devices can be taken from place to place, and normally support a single user. Quadrant ② shows technologies that are less portable but still offer personal interactions with learning experiences. They can be seen as static in the sense that they can only be used in one location, but remain personal because they can be allocated to one single user. Quadrant ③ shows technologies that can serve users on the move, but the devices themselves are not movable. They are less personal because typically they are shared between multiple users. Quadrant ④ shows devices for more shareable interactions, but less portable. Therefore, they would generally not be classed as mobile technologies. It has been included to show the complete space of possibilities engendered by the classification (Naismith et al., 2004).

In this study, I considered personal portable technologies (quadrant ①), and focused on the common mobile devices the participants already had, such as MP3 players, radios, etc.

Klopfer, Squire & Jenkins (2002) identified five features of mobile devices (PDAs in this case) that produce unique educational affordances:

- Mobility/Portability– the small size and weight of mobile devices mean they can be held and carried any place, any time learning takes place
- Social Interactivity – data exchange and collaboration with other people can happen face to face
- Context Sensitivity – mobile devices can gather and respond to data unique to the current location, environment and time, including both real and simulated data
- Connectivity – a shared network environment can be created by connecting mobile devices to data collection devices, other devices or to a common network
- Individuality – scaffolding can be customized to the individual's path of investigation

With the advances of mobile technologies, many educators believe they may have great impact on learning. Learning will become highly pervasive (Thomas, 2005), situated, personal, collaborative and lifelong, in a word, truly learner-centered (Naismith et al., 2004).

2.2.3 Critical Review of Some Research on ESL M-learning

Here I examine some concrete practices on using mobile technologies to improve English learning.

Thornton and Houser (2005) designed an English m-learning study by emailing mini vocabulary lessons at timed intervals to students' mobile phones. Three times a day, at 9:00, 12:30, and 17:00 hours, they emailed short mini-lessons (less than 100 words of text or 365 bytes each) to 44 female Japanese university students in two EFL classes.

Lessons were discrete chunks readable on the tiny screens of mobile phones. They defined five words per week, using each word in multiple contexts, reviewing previously introduced vocabulary, and incorporating target words in story episodes.

Their study was based on the research of the brain and learning, which advises repeated exposure and distributed practice instead of massed practice. The study suggested that using a mobile phone is an effective method to promote more regular interval study. Therefore it leads to better learning. They attributed that learning achievement to the "*push* media" (Thornton & Houser, 2005, p. 221) like email or short messaging service (compared to pull media like Web, paper).

What shed light on my study is their analysis of the limitation of their study, as they wrote:

> We sent three messages each day and assumed students would read our messages as they arrived, but only 10% of our subjects reported reading our messages three times a day. Thirty-three percent read our messages two times a day, and the majority (57%) read our messages only once each day. Subsequent interviews found that students tend to postpone reading our foreign-language messages until they have time to concentrate on them, typically while commuting home from school. Thus we enjoyed limited success in promoting carefully timed interval study. (Thornton & Houser, 2005, p. 222)

Their mobile mini vocabulary lessons need students' concentration. Due to the feature of mobility/portability, mobile devices limit the forms of learning activities suitable to be done. It seems that the effective mobile language learning system requires new ways of thinking. Maybe we can consider designing new forms of learning that require less concentration to be done on the move to complement traditional studying.

The critical review of the following research on ESL m-learning further convinced me that this was a gap in ESL m-learning research that I wanted to tackle with in my study.

Stockwell (2007) investigated the use of a prototype mobile phone-based intelligent vocabulary tutor system by learners in an advanced EFL class at a university. The system was written in PHP and MySQL, and was accessible from a web browser, either on a desktop computer or mobile phone. Both the PC and mobile platforms accessed the same database, so the content was identical, but a simplified interface was designed for the mobile phone to counterbalance the problems caused by small screens and keypads. Learners progressed through each lesson in turn, and were not able to proceed to the next level until they had completed the previous one satisfactorily. Vocabulary items from the lesson were presented in random order, and a competency score was assigned to each item depending on whether students got it correct in the vocabulary tasks. Items with lower competency scores were recycled with greater frequency. When all items reached the high score representing "known", the learner was able to go on to the next level. There were six different vocabulary task types: choose the appropriate word for a sentence, choose the appropriate word for an English definition, choose the appropriate word for a Japanese meaning, match a list of words with their English definitions, write a word for an English definition, and write the appropriate word for an English sentence.

The study revealed that learners exhibited a clear preference for the computer and achieved better scores while performing vocabulary tasks on computers. Accordingly, Stockwell inferred that the obstacles to the use of the mobile technologies may be categorized as technological or psychological, or perhaps a combination of the two.

For me, it is not difficult to explain the clear preference for the computer rather than the mobile phone. All the vocabulary tasks are reading/writing tasks, while compared to the desktop computer, the mobile phone has limited displays and restricted input methods. Therefore, I don't think Stockwell's categorization of the obstacles to the use of the mobile technologies is complete.

Just as Milton (2002) pointed out, it is a very common feature of technology-based language teaching materials, that they are technology-led rather than pedagogy-led. The materials often use a clever piece of technology because it can be done, rather than because it can more effectively promote the proven learning practices or address special problems that cannot be solved in traditional learning environment.

For mobile technologies, realizing the gap in the existing research, following the suggestion of placing the focus on the learner ahead of the technologies (Colpaert, 2004), my system design was grounded on the thoughtful application of second language acquisition pedagogy and learners' needs analysis.

2.3 Summary of Literature Review

In this chapter, I briefly reviewed the relevant theories and research in SLA. Some important concepts and factors were organized into a diagram framework for the second language acquisition process (Figure 1) and were explained in detail within each stage of the process. Others included discussions on the Critical Period Hypothesis, Monitor Hypothesis, studies on the role of learners' first language and research on some relevant learning activities. I also briefly reviewed the history of theoretical perspectives and application of advanced technologies in SLA. For general m-learning, I introduced the classification of mobile technologies and their educational affordances. For specific ESL m-learning, I critically reviewed some research and identified the gap which I decided to address in my study.

Thus the literature review not only provided the background, context and corroborating evidence for my study, especially for my Mobile English Listening System design, but also directed my study, that was trying to explore a better way of approaching mobile English learning instead of blindly and simply moving the existing learning activities to the mobile devices.

CHAPTER THREE: Methods

This chapter introduces the research design and procedures. It also explains why qualitative case study is appropriate to inquire into my research questions, exemplifies some interview questions asked in the field, describes the strategy for participant sampling and procedure of data collecting, managing and analyzing. Finally it briefly mentions my considerations on ethics and validation of this case study.

3.1 Research Design and Procedures

This qualitative case study attempted to explore mobile learning in the field of second language learning, especially for Chinese adult English learners. It included two interviews with five participants. During the first interviews, participants provided data on their previous experiences and thoughts about learning English. Based on the knowledge from reviewing the literature and analyzing the data from the first interview, a Mobile English Listening System (which included approximately 11 hours of audio learning materials) was designed to help learners improve listening/speaking skills. All of the audio materials were selected from the Internet and book stores. Participants were invited to experiment with this system and share their learning experiences, problems and thoughts three/four months later. The second interviews focused mainly on understanding the quality of the specific listening materials and the process of mobile listening.

Next, I justify my choice of qualitative case approach to this study and discuss my decision on evaluation and measurement of language knowledge in this study.

3.2 Qualitative Case Study

There is no better way to test one's linguistic skills than to place him/her in the authentic context, to see whether he/she can understand completely and get his/her own ideas across fully.

Standardized tests which focus mainly on understanding of the meaning (e.g., multiple-choice items or true-false items) are problematic in completely measuring learners linguistic skills. As Gass (1997) noted it may be possible to know little of the syntax, and to rely only on lexical knowledge and knowledge of the subject matter as decoding cues. In this study, I didn't consider such knowledge satisfactory in our language learning, because often learners with so-called "*reading knowledge*" (Gass, 1997, p. 149) have difficulty in encoding the target language in speaking and writing.

In fact, the strategy needed to pass most standardized exams may mislead learners not to try to advance to higher levels of comprehending/analyzing the syntax of the language (which is our ultimate goal in language learning). After coming to Canada, I realized that my previous learning methods (which did quite well in helping me pass all required standardized tests) did not work well to further improve my English. I tried some different methods, which I think was more effective to achieve the above definition of English learning goals, but not effective to pass traditional exams.

Based on the above considerations about the evaluation of language skills, this study targeted the population of adult English learners without pressure of traditional examinations. They are motivated by their desire to integrate into a new language community or to get a better job. They can study at their own pace. They are free to reflect on and adjust their learning from time to time including learning materials, learning methods, and learning environment. Their answers to the interview questions may be different because of the distinct definition of language learning. In my study, rather than measuring specific language learning gains, I had participants evaluate their effectiveness of learning in the real application context at their own discretion (e.g., changes in their self-confidence in learning/expressing, changes in their lives which are affected by their language skills, etc.).

Therefore, for this study, quantitative statistical analyses might not be sensitive to individual differences, and qualitative case study is an appropriate approach because I

needed to observe and talk directly with different people to get a complex, detailed understanding of the issues.

3.3 Participant Sampling

In this case study, I used "maximum variation" (Miles & Huberman, 1994, p. 28) as my purposeful sampling strategy, considering the following criteria that differentiate participants:

- Introverted/extroverted learners
- Visual/auditory/kinesthetic learning
- Deductive/inductive reasoning
- Tolerance of ambiguity
  (Selected from Hubbard's categorization of language learner variables (1992, p. 51))

My targeted population was Chinese adult immigrants in Calgary. Many friends of mine were invited as my research participants. Because I have been quite familiar with these people already, I was able to invite participants who have quite different personalities based on the above criteria. In addition, as to the particular research questions, I invited both insiders (who had been using mobile devices in their English learning already) and outsiders (who were not using mobile technologies) to explore the present limitations of technologies, alternative solutions, and identify potential added-values of mobile technologies.

3.4 Interview Questions

Based on the research questions (How can educators use the portability of personal mobile devices to help adult ESL learners? How does the portability of mobile devices facilitate adult ESL learning?) I restated it to more specific terms addressing the semi-structured interview participants. These interview questions were open-ended, nondirectional and evolving, covering participants' learning activities, experiences and

thoughts/beliefs. They served only as a general guide and reminder to organize thoughts, and were adapted to individual participants and specific situations at the scene.

For example,

- Questions related to activities:

  What learning activities do you think can be transferred to mobile language learning environment in order to get better learning gains?

- Questions related to experiences:

  How do you use mobile devices in your language learning?

- Questions related to thoughts/beliefs:

  What tools or learning materials do you want to have on hand any time, any where in terms of language learning?

A more detailed list of sample interview questions can be found in Appendix B: Interview Protocol (for both interviews).

3.5 Data Collection and Analysis

In this study, I collected multiple sources of information extensively from the fields described below:

① Conducted semi-structured, one-on-one, open-ended interviews, audiotaped the conversations with digital recorder, transcribed and translated the interviews (see Appendix B: Interview Protocol. Note: The protocol only served as a sample to help organize thoughts. The actual interview questions asked in the field varied from individual to individual.)

② Gathered field notes (including descriptive and reflective) by conducting direct observations to gain deeper understanding of participants' real meanings with the aid of facial expression, body language, etc

③ As a participant-observer, I also wrote personal reflections on my firsthand involvement experience in participant observations

Here, observation was not limited to the session of in-depth interviews. For example, I noticed there was an English dictionary in my participant's bathroom. Maybe she did not associate it with m-learning, but I could see the potential need of a mobile dictionary for her English learning from this observation.

The data analysis process was a spiral procedure beginning with data collecting, managing, moving up to data analyzing, classifying, and ending up with data interpreting and representation. It is noteworthy that these steps were interrelated and moving back and forth in circles rather than a linear procedure.

At the early stage, I organized the interview data (original MP3 files and their transcripts), fieldnotes and my reflection writing into computer file folders. Then by reading the data several times, I tried to get a sense of each interview as a whole before breaking it into parts. Next, I developed categories/codes and sorted text into categories by reviewing and re-reviewing my database. Although some categories matched the lengthy text segments they might be discarded if they were not relevant to the m-learning environment. Finally, I synthesized and combined the categories into more abstract topics/themes that I used in the end to write my account.

During the classifying/coding process, I did not count the number times of each category appeared in the database. Instead, I searched for evidence from reviewing the literature to further support my interpretation and decision in more general context.

3.6 Considerations on Ethics and Validation

The research was granted ethical approval by the Conjoint Faculties Research Ethics Board for the University of Calgary in July of 2009 before data collection.

The validity of this case study was established by using multiple and different sources of data, by having participants review and correct the transcripts/translations of the relevant data they provided, by writing with detailed and thick description (e.g., extensive quotes and discussions), and by taking the entire final written account back to participants for member checking as Creswell suggested (Creswell, 2007).

# # #

In summary, this chapter described the design and methods showing how the study was conducted, especially the rational of selecting qualitative case study, the strategy of participant sampling, data collection method, data analysis procedure and validation strategies in this research.

CHAPTER FOUR: FINDINGS

This chapter presents data analysis of this study, which includes the findings of the themes identified in the first interviews and discussion on needs analysis of my Mobile English Listening System design, the description of my listening system and the discussion of themes identified from the second interviews after experimenting with the system.

4.1 Needs Analysis

In July and August of 2009, I conducted the first in-depth, detailed interviews with five final participants who were willing to share experiences, were good at reflecting on and expressing ideas. In this thesis, I used names participant A, B, C, D and E to protect their anonymity.

In the interviews, I focused on the past experiences of English learning, their beliefs, methods and problems in English learning, especially in mobile learning practice. The followings are the general themes identified: ① adult English learning is different from children learning language, ② learning activities and ③ learning materials in m-learning.

4.1.1 Findings of the First Interviews

Theme one: Adult English Learning is Different from Children Learning Language

We might have already noticed that examples of adult learners gaining complete fluency in a foreign language are rare while it is quite common for children to end up as near-native speakers. The interviews confirmed this reality, but also showed that adult learners have stronger self-directedness and perseverance – they refuse to give up:

- I was shocked to find that so many old immigrants, after living in Canada over ten years, still can not speak fluent and correct English (Participant E).
- Many people think after living in English-speaking country for one or two years, their English will become great automatically. That is not the case with adults. In my

> opinion, if we can do any better than those who do not have the experience of living abroad, that is because we have more pressure living with English, and we spend more effort and time in learning English (Participant C).

However, all of my participants believed that with consistent effort, adults are able to master English, at least at a certain level they consider satisfactory as a communication tool. They continued learning after entering their thirties/forties, together with their children.

> Except for native accent, I feel we adults are also able to be successful, as long as we keep learning (Participant A).

Then, what is the difference between children and adults in ESL learning? What can we learn from children? What should adult learners pay special attention to their common limitations?

In the interviews, I made an attempt to look into the possible answers to the above questions. The participants' observations showed that the differences exist in learner's personality (including affective filter and learning style), learning activity (repeating) and past experiences (including relevant prior-knowledge and interference of native language).

The participants pointed out children have a low affective filter to learning – they don't fear making mistakes or feel nervous like many adults, who can not help thinking of saving faces all the time.

> Kids are not nervous when they speak English. They do not feel embarrassed when making mistakes. It's a good condition for learning from real conversations (Participant E).

My participants admitted that adult learners appear to be of more analytical learners and visual learners rather than memory-based audio learners like children.

- Kids are good at learning language through listening. They can memorize big chunks of speech without understanding them at all. But I can only remember what I understood (Participant A).

- I find it easier for me to remember what I see instead of what I hear. For example, I can't remember the names of a person, a place... in English until I write them down (Participant C).

Many participants owed the success of language learning for children to the learning activity of repeating that doesn't appeal to adults.

- I am amazed that my kids can repeat the same story book again and again and again, and still with great interest (Participant D).

- My daughter always asks me to repeat the same story time after time, even after she memorizes all the lines in the book. But for me, I get tired quickly of repeating it. After reading it so many times, I feel bored when I open the book again (Participant B).

Some participants recognized that there is a big difference in second language study between them and children caused by their prior-knowledge. Their native language might interfere with their second language learning.

- If the knowledge is new to me, and I learned it with English first, then on this subject, I will use English easily. But if it was first obtained in China, when I try to explain it in English, Chinese always come into my mind first (Participant C).

- In China, my daughter told her aunt her English name. Her aunt does not speak English. Although the name only has two syllables, her aunt could not repeat it accurately. But you can find that she used the most similar sound in her native language system. This made me think maybe the sound she heard was altered unconsciously by her brain (Participant D).

Adult English learning is different from children learning language. That is to say, adults learn differently than children who may automatically acquire a given language from mere exposure. Adult learners have to learn a second language through a conscious effort. In the next theme, I explore what learning activities are effective for adult learners.

Theme two: Learning Activities

During the interviews, we discussed learning activities such as face-to-face conversation, listening and repeating. The following findings emerged: issues on face-to-face conversation and the role of conversation, importance of listening, importance of repetition, and problems in repeated listening.

Many participants highly valued face-to-face conversations for providing a good learning environment:

> Conversations make me more alert. After I engaged in a face-to-face conversation, the partner's words would resound in my head for a long time (Participant C).

However, there were different opinions commenting on the bad experiences of conversations such as nervousness, pressure, too focused on meaning:

- I am always nervous in face-to-face conversations. All my effort was focused on how to understand the partner's meaning and how to convey my thoughts. I have no time to notice what words they used, or even what I have used. I hope I can be more relaxed and make each sentence without hurry, but the long pause I need during the conversation seems terrible for me (Participant E).

- I know my speech is full of mistakes. But I have too much pressure to keep moving on. So, I just keep making the same mistakes over and over again. This makes me very frustrated. In this process, I don't see any improvement. It seems that at my current level of linguistic proficiency, self-paced learning environment is more

> helpful than free conversations. I need a slower speech and repeated listening (Participant A).

There are other issues on naturalistic face-to-face conversation – no helpful feedback:

> In free conversations with native speakers, they usually won't correct you (Participant C).

Instead, in many cases, the English-speaker would imitate the non-native speaker during the conversation, or kindly simplifying their speech to somewhat like ungrammatical baby-talk to keep talking, maybe out of consideration of being polite or in order to make the language easier to understand.

For example, once, Participant D talked about the politics in China with a Canadian. He had difficulty with pronouncing the word "communist" in "communist party", and it sounded like "community". Instead of giving him a good exemplar, the native speaker copied him. Eventually, they all used "community party" during the rest of the conversation.

As to what role do conversations play in successful language acquisition, I found that in many situations, by simply exposing learners to talk, language learning may not take place. More commonly, the reflection on the conversation afterwards is the real learning. As my participant C described:

> After the conversation, I would review and think over the conversation when I traveled home by car, even used dictionaries after I got home. I think it is the follow-up activity that helps me get more confident English language (Participant C).

We all admitted that listening is an important way to learn listening/speaking skills.

- To improve listening and speaking skills, we need to listen a lot (Participant B).

- I found that audio lessons are more effective than reading lessons in terms of improving speaking. The vocabulary or phrases I learned with my ears seem to be easily recalled while speaking (Participant D).

In this study, listening got special attention because it is suitable in a moving environment.

> I do not like reading while moving, but listening is fine. So I think a listening activity is suitable in mobile learning English (Participant A).

Also, the importance of repetition in language learning is undeniable as participant D commented:

> Usually, I need to repeat listening lots and lots of times, until I can use the language (Participant D).

I noticed speaking and listening are commonly missing goals in traditional school teaching/learning, as the participants expressed:

- I thought my English was good, because I passed almost all major tests (TOEFL, IELTS). But when I came to Canada, I was shocked – I couldn't understand anyone. The more frustrated thing was that they couldn't understand me either (Participant C)!

- I knew all of the grammar rules. But I couldn't use the correct grammar in a real conversation (Participant E).

But learners also complained that repeated listening activity which can address the above problem is boring:

> I know repeating is essential to language learning, but it is kind of boring when you just repeat the same stuff again and again (Participant A).

In the next theme, I further focus on repeated listening activity and collect the data on features of learning materials suitable in m-learning.

Theme three: Learning Materials in M-learning

Interviews showed that learning materials on the move should be easy, attractive and covering varieties of topics and forms.

- Some times, I found it difficult to focus on listening to radio programs while I am driving. It seemed too difficult for me; I need more attention and concentration in order to understand them (Participant A).

- If the content is not interesting, it will not hold me very long. It is true in Chinese, not to mention in English (Participant B).

Many English learners complain that after some period of learning, it is easy to understand the conversation between a native speaker and them, but they still have difficulty understanding the conversation between native speakers.

> I can understand what the teacher said in classroom, but I can't understand native speakers on the street (Participant B).

I found one of the reasons is that their learning materials did not cover those topics and forms.

- One possible reason is that in real conversations, they speak rapidly and use contractions which are quite different from what we learned at school (Participant B).

- Different topics have their specific groups of vocabulary; we need to learn all varieties of learning materials to get different meanings of every single word (Participant E).

4.1.2 Discussions of Needs Analysis

Theme one showed that adult English learning is different from children learning language. The differences can be found in affective filter and learning style, learning activity of repeating, relevant prior-knowledge and interference of native language.

Here, I would like further expand the discussion of interference of native language from my own learning experience.

Native language might play different roles for learners with different language skills, learning goals, and in different age groups. In this study, I maintained that adult learners should pay more attention on the adverse effect of their native language.

From my experience, my native language played different roles at different stages in my learning.

At the beginning stage, understanding was the major learning objective. I used my native language to help me learn. I translated English sentences into Chinese, and Chinese sentences into English. Through this method, my English improved quickly, especially in reading and simple writing.

Now, as an intermediate ESL learner, I find my first language becomes a hindrance from further improving my English skills. Whenever I want to express something, the Chinese sentence will first pop up. By translating it into English, my expression is unnatural and difficult to be understood by natives. When I read English articles, I can understand the main point. But even immediately after I read a long sentence, usually I can not repeat it completely identical to the original English text if closing the book, although I know each word in the sentence. I realize the reason is that, while reading I translate it into Chinese in my mind unconsciously to get the meaning and do not attend to its linguistic form. Borrowing from the concept I introduced in the literature review, first language may be a useful tool to help me decode language for meaning. But when I want to encode the English language for expressing, first language becomes a barrier.

Many young kids overcome this barrier by simply forgetting their native language. It is very common that when young immigrant children learn English, their developed Chinese language skills can be quickly lost. In the literature review, I introduced a theory to explain this common phenomenon of first-language attrition as just the evidence of an adaptive role of inhibitory control on first language in order to acquire a second language.

But many adult Chinese ESL learners do not realize this problem; they heavily depend on an English-Chinese dictionary to help them learn English. I think this practice should be disposed of as soon as possible, because it establishes mapping from each English word to its Chinese definition (but this mapping is neither accurate nor can be one-to-one reversible). Every time they read/hear an English word, this mapping will be strengthened. When it is time for learners to produce English, they are also used to relying on translation. First, they think the intended meaning in a Chinese sentence. But, the following process of translation restrained the syntactic structure constructed and the vocabulary selected due to their first language, making the expression difficult to be understood by those who have little knowledge about their native language.

Language is used not only to describe tangible objects, but it can also be used to help us organize our abstract thoughts and coordinate the mental functionality in our mind (e.g., thinking and reasoning). In other words, language can alter the entire flow and structure of mental functions. To eventually master a foreign language, we need to learn how to think with target language directly, without translation.

There has been common acceptance that different learners benefit from different learning methods. From Theme one I concluded that mere exposure does not work very well for most adult learners like it does for children.

Theme two showed what effective learning activities can address adult learns' problems. Naturalistic conversation has its issues, and repeated listening is the focus I further studied in this research.

In China, I once went to English corners where learners practiced their English speaking and listening skills through free conversations. But I didn't find it very helpful if the learning was only limited there without follow-up activities. In many cases, we could not notice our common errors. For example, we said "put on clothes", and we said "put off clothes". We could understand each other very well.

Although, while talking with non-native speakers, learners may feel more comfortable (do not feel they are losing face) by indicating a non-understanding, putting the conversation on hold and negotiating particular forms or meanings. Many learners share the same belief that they could not possibly learn from their ESL classmates, and that they may even suffer from being exposed to their bad English.

One of the advantages for learning English while living in English-speaking country is the opportunity to engage in real conversation. However, I found many adult ESL learners seem to need some self-learning to prepare them before they can feel comfortable and truly benefit from real conversations.

Generally, human-to-human interaction is a natural and direct way to create an environment that would promote the SLA by making the learner pay attention to the linguistic form of the message. But we also need to consider learner's learning style (introverted vs. extroverted or interpersonal vs. intrapersonal) and proficiency level (be able to process language input beyond the level of struggling to understand the general meaning during fast-paced conversation). Otherwise, high affective filters (such as anxiety due to lack of confidence/proficiency) may block the input and prevent learning from taking place.

The interviews also showed another problem during conversations with native speakers – no direct feedback on the error of language use.

Then the interview data confirmed Gass's (1997) suggestion of a catalyst on the role negotiation plays in successful language acquisition.

After two years of study in my graduate program in Canada, I was not satisfied with my improvement in English. I talked with some other Chinese graduate students (majoring in engineering, chemistry, computer science...) studying in Canada. To my surprise, the unanimous conclusion was that taking courses in their speciality contributed only marginally to improving English.

They did not lack engaging in dialogue in their classroom every week. Why couldn't their English study benefit from it? I realized that the reason was that the purpose of the talk in the class was too focused on exchanging ideas rather than speaking in grammatically-correct English (especially under the pressure of speciality study). For them, English was just one of numerous communication tools needed to achieve this exchange; they could express their ideas through many other tools which might be more convincing such as reasoning by math formulas, showing the process of experiment in chemical laboratory, or offering the result of programming in a computer... and last, bad English.

Their common statements regarding their study in their specialities were like this:

> As long as I can understand the general main point, I don't look up new words in dictionary, because I have no time.
>
> All the ideas in my mind are organized with the Chinese language. I am struggling to translate them into English with the immediate available words, simplest syntax, without thinking grammar. Although maybe my speaking is full of grammatical mistakes, but the idea is original. That is more important in my study.

But this is a big problem for English study, because the learning takes place during a communication task where the participants try to solve communication problems rather than to keep conversations going.

ESL learners need to develop their own meta-linguistic awareness in order to stimulate a change in their inter-language. During conversation, learners may develop their own phrases and vocabulary usage that works because they only need to understand each

other. It's quite possible for them to avoid the linguistic analysis (at the same time, to lose the opportunity to study language) because they have many other paralinguistic means (e.g., facial expression, body language, gesture, etc.) or only rely on some key words.

As for language learning defined in this study, processing on the level of meaning is far from enough. Learners need to focus on the linguistic elements as they arise incidentally during conversations, although their overriding focus is on meaning and communication. Without such attention and consequent awareness of the knowledge gap, they will have no reason to stop using inappropriate expressions that works in conversation.

Using Krashen's Monitor hypothesis, I can analyze the reason why the conversation described above fails to help improve learners English speaking skills.

Although learners have an adequate learned system in place to help them monitor their speech, they need time to focus on form and think about the appropriate rules available to them in their learned system. In other words, they need to pay attention to how they are saying something, not just to what they are saying in order to improve their English.

However, under the pressure of naturalistic face-to-face conversations, learners are always so absorbed by the goal of exchanging meaning that they have no resources left to focus on the linguistic form of conversation, and they have no time to think about the language they are making, therefore there are no learning gains from their learned system.

In these cases, by simply exposing learners to talk, language learning can not take place. In fact, the real learning happens more commonly after the conversation. Those accompanying or follow-up learning activities which help learners review their doubts and further explore additional evidence are needed to complement the learning through conversations. Thanks to the Internet, we now are able to easily access authentic materials to confirm right answers or find good models from the online English speaking community.

Listening is an important way to learn listening/speaking skills. This observation in the interviews joined the cross-media comparison study I introduced in the literature review that led to the conclusion that compared with the visual data, the data processed through audio channel (e.g., from listening) is easier to be recalled when speaking.

From my experience I found listening is important because it can also prepare learners ears' for being sensitive to English sound and help gain confidence in speaking.

In the first year after I came to Canada, when I turned on the radio, I was very upset because I could understand nothing. I couldn't understand the weather forecast, or the traffic report, not to mention news, interviews and debates. They spoke too quickly; it was difficult to hear anything. I was sure there must be many words I knew, but I just couldn't separate them.

I left the radio on when I was driving, when I was cooking and when I was cleaning, without thinking whether or not I can understand it. After some time, I was surprised to find I recognized more and more words I already knew. Then I was able to identify some new words.

I believe in this process, my brain was working unconsciously. It did not require much of my conscious attention, but did play a crucial role in improving my listening skills – my ears seem to be used to and become more and more sensitive to the subtle nuances of target language sound.

Repeated listening can help prepare the listening input recognizable and available to be further processed. Many ESL learners, especially those who are not living abroad, find English listening is extremely difficult because of lacking this preparation to their ears.

In the interviews, many participants commented that they felt embarrassed while speaking. They had no confidence in their speaking because it sounded strange to them.

Let us think of learning to sing a song. We listen to it many, many times until it is etched in our mind. Then, while we are singing, by comparing the sound we are making in our

mind, we are able to adjust our sound to ensure we are in tune. Eventually, we can be confident that we can sing it.

I think this is true of speaking English. If the pronunciation of English words can be fixed in our mind, when we are speaking, by comparing what we are saying, we can have confidence as well. In other words, I think one solution to lack of confidence with speaking lies in listening many times until we can hear English in our mind vividly before we utter it.

Definitely, schools have realized the essential role of listening for students in helping develop a good accent and listening skills. Many schools specifically offer listening courses using language laboratories. The problem is, the amount of class time is far from adequate, and the isolated and concentrated (vs. spaced) forms of classroom practice is disengaging and ineffective. To improve listening and speaking skills, we need to repeat listening more often and more effectively, constantly.

As for the importance of repetition, supportive evidence can also be found from varieties of perspectives in every stage of the previously introduced framework for the second language acquisition process.

First, repetition can help learners notice the input. Those that appear repeatedly in the input are more likely to be noticed. In other words, frequency can make input salient – externally created input enhancement.

Due to the limited processing capacity of the human brain, at a given point in time, we can only focus attention on limited aspects of input. This necessitates repetition as the way to obtain a holistic picture of multiple aspects of language data, from semantics to syntax, from morphology to phonology, from linguistics to pragmatics.

I discussed before that positive evidence alone (learners are exposed to the standard second language grammar) is not sufficient for learners to develop a complete grammar, and negative evidence is also necessary for second language acquisition. In fact, direct

negative evidence (e.g., corrections by the speech community) is not easy to access, especially outside the classroom context. Thus, we need to rely heavily on indirect negative evidence. From the definition of indirect negative evidence – an indirect means of letting the learner know that a feature is not possible because, it is never present in the expected environment, we can see repetition have a vital role in establishing the so called expectations of language data. When certain forms are heard or read over and over again in the similar scenario, they are repeatedly strengthened, resulting in confident knowledge of learners. Consequently, learners are able to realize the incongruity between their own utterances (inter-language) and the expected expression in the similar context – this way get the indirect negative evidence.

At the stage of comprehending and integrating, repeated input data serves to reconfirm hypotheses and strengthen learned rules (positive evidence). It is also self-evident that without repetitive input, different levels of analysis and reanalysis cannot take place. For example, through repetition, the same input can be analyzed from the level of meaning to the level of morphology, lexicon, or syntax, and eventually integrate into the learners system for retrieval; Or, to put it differently, in terms of learners' performance, from comprehension to production.

From the perspective of psycholinguistics, most automatic processes require an appreciable amount of training to develop fully and become routinized. We need consistent, repeated mapping and practice to automatize controlled knowledge in order to improve learners' proficiency, to understand English input easily, quickly and automatically.

Finally, repetition also serves an important purpose in helping retrieve information while learners produce output. Repeated practice of grammar to output results in automatic production (i.e., speaking and writing English spontaneously, naturally and skillfully).

The point to note is that although repetition comes from the same input, the learning process activated by the same input can be different at various times. Learners can focus their attention on a different aspect of the same input at a time. Different focus further leads to different analysis and acquisition. I further gathered interview data on this issue and discussed the process of repetition during the second interviews.

At traditional schools in China, most of the English learning time is spent on explaining and analyzing textbooks. But spoken English is different from written English in textbooks. The learning methods to improving listening and speaking are different from improving reading and writing skills. For listening and speaking we need lots and lots of repeated listening.

Is it possible for school teaching to strengthen repeated listening activity in classroom?

Listening is important in language learning. But repeated listening activity (especially after learners understand the meaning) is not suitable to take up class time because it does not require much teacher intervention.

However, the low demand of teacher intervention in repeated listening activities just lends itself to a mobile self-learning environment. To be able to listen more, we need portable and personal devices that have the advantage of ubiquity – available to every learner anywhere anytime.

But I also noticed that learners complain that repeated listening activity is boring.

I guess for every adult learner, this is a challenge. I think we don't need to challenge our limit of perseverance on this issue. By using mobile devices, we can make the boring repeated listening fun. This is one of major issues I addressed in this research later while further exploring the mobile listening materials and listening process during the analysis of second interviews.

Therefore, from the interview of effective learning activities, I got the idea of designing a repeated listening system for learning in a mobile environment. It targets a different

style of adult learners from children's. Weaker audio adult learners need more listening activity.

Theme three showed learning materials on the move should be easy, attractive and covering varieties of topics and forms. Following is the further discussion of these ideas:

The idea of easy listening materials echoes the importance of comprehension.

In the framework for the second language acquisition process, the first stage of learning is to notice the input. We do not deny that language learning can take place without awareness or consciousness. However, on the part of the educators, one of the main goals of pedagogical intervention should be to maximize externally enhanced input. In the language classroom, many methods are used to help make linguistic forms salient: coloring, explaining, emphasizing, stressing, repeating, etc. It is also true for designing ESL m-learning. That is to say, effort should be made to design attractive learning materials and engaging learning activities. This differs from naturalistic materials so as to help learners lower their input filters and aid learners to notice their knowledge gap (bringing to learners' attention the mismatch between their inter-language and the target language), thus let more input pass through smoothly and effectively.

Most of what we learned in China was English in textbooks. Written language is different from spoken language. Most textbooks we used at school focused on teaching reading and writing English. The vocabulary, grammar, style are for writing. In normal conversation, native speakers use lots of slang, idioms, casual phrases that learners do not learn. Therefore, based on our specific goal of English learning, we need to add different forms of material (i.e., spoken English) – materials similar to those for native speakers, materials that the native speakers listen to and speak everyday. In addition, language always keeps changing, especially at this time of rapid change. New words which reflect the new event in culture and society keep growing every day. By virtue of the Internet, nowadays, we are not limited to the published textbooks. We can find varieties of suitable materials on the WEB.

4.1.3 Summary on Needs Analysis

Based on the above finding and discussion, with the consideration of the affordances of the mobile devices the participants had and the characteristics of mobile learning, I decided to design my further m-learning research revolving around listening to English in mobile environment (using voice function of mobile devices) to improve learners' listening and speaking skills. The main rationales were as follows:

① The communicative approach (the most direct way in our native language development) is not suitable to most adult learners. For many adult learners, they first need a more relaxed and self-paced learning environment preparation before entering real conversations comfortably.

② For most adult learners, the skills of learning through listening have decreased. Therefore, we need to especially increase listening activity for adult language learners.

③ Listening and speaking are commonly missing goals in traditional English classroom teaching/learning.

④ Repeated listening is an effective way to improve learners' listening and speaking skills.

⑤ After we understand the meaning, we still need lots of repeated listening, beyond learners' dedicated study time. Therefore we need ubiquitous mobile devices so that we can listen to English as frequently as we can.

⑥ Listening activity is suitable for mobile learning because it does not require so much attentional resources (even unconsciously in terms of increasing the sensitivity of our ears).

⑦ Listening activity is suitable for self-learning because in many cases, it does not need much assistance.

From the existing research and participants' experience, I learned some guidelines to choose learning materials and learning activities suitable in m-learning. For example, listening materials suitable in m-learning environment should be

① Short

② Easy to Understand

③ Attractive

④ Covering Varieties of Forms and Topics

I also identified some challenges to address to design m-learning listening activities as follows:

① How to make repeated listening tolerable, even fun for adult learners? How to make listening activities more engaging and effective?

②How to help learners integrate some English learning activity into their daily life and extend to lifelong learning?

③ How to help learners reflect their own learning process and select the learning strategies best suited to their needs?

④ How to help adults become aware of and deal with the interference from their native language?

⑤How to help learners be aware of the mismatch between their inter-language and the target language while studying alone?

⑥ How to study alone a language which is inherently social?

As I demonstrate below, using the existing devices available to the participants, I designed an ESL m-learning system. Some of the above problems could be solved by this system. To address other problems, I further proposed some suggestions, which hopefully could be accomplished by the development of the devices and teaching practices.

In the next stage of this study, I chose some listening materials based on the criteria set above to make my Mobile Listening System.

4.2 Mobile English Listening System

In this section, I introduce my Mobile English Listening System used in this study, including the purpose of the system and the features of the selected mobile listening materials.

4.2.1 Purpose of the Mobile English Listening System

From the literature review, we learned that there are different levels of comprehension that can take place during language learning: for example, semantic comprehension (at the level of meaning – having an understanding of the general message), and syntactic comprehension (at the level of component parts – having an understanding on the syntactic/phonological relations). Generally semantic comprehension is a prerequisite to syntactic comprehension, but it does not guarantee syntactic comprehension. In order to speak English fluently, learners need to go beyond the level of language decoding (semantic comprehension) to be able to encode the English language.

From needs analysis, I found that many learners need more repeated listening activity to help pass the level of language decoding. To help them improve listening/speaking, I proposed the Mobile English Listening System which utilized the mobile technologies to facilitate repeated listening activity.

The following diagram (Figure 5) indicates the targeted learning activity this learning system aimed to facilitate.

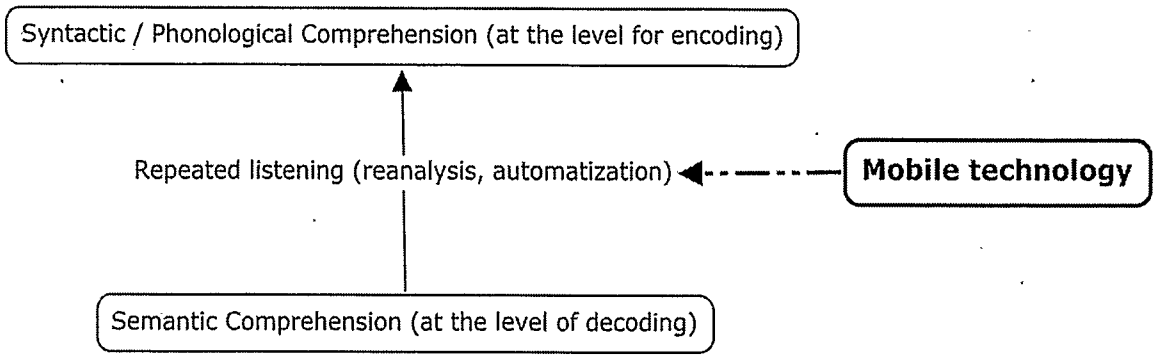

Figure 5: Mobile English Listening System

The figure illustrates that after semantic comprehension (understanding the meaning), ESL adult learners still need repeated listening to deepen their comprehension to syntactic/phonological level, and to automatize the learned knowledge. Mobile technologies are suitable to be used in this learning activity because it does not require much teacher intervention, even does not require so much attentional resources. What we need to think is how to facilitate learners to listen lots and lots more, and how to help them repeat correctly.

4.2.2 Features of the Selected Mobile Listening Materials

Based on the criteria I got from needs analysis, I selected approximately 11 hours of audio learning materials (MP3 files) from the Internet and book stores (see Appendix A: Mobile English Listening System). They have common features and at the same time represent different ideas and methods of ESL mobile learning.

The following common features agree with my criteria: "short", "easy to understand", "attractive" and "covering varieties of forms and topics".

(1). Short – little chunk

Each audio file lasts between 3 to 15 minutes. That means learners do not need a long time of concentration. They can listen while they are travelling, cooking, etc., all on the move.

(2). Easy to Understand

Earlier I pointed out that the process of comprehending depends on the learner. Learners have different linguistic levels and different learning objectives. As for my participants in this study, they were a learner group that had less difficulty reading, so this study aimed to improve their listening and speaking skills.

As Milton (2002) pointed out, materials directly drawn from original materials in the target language and not specially written for educational purposes are likely to be only truly comprehensible to the most advanced learners. The language of TV series and films in particular, can be highly colloquial or arcane and is much less suitable for language learning purposes than specially written and controlled materials.

I selected the listening materials specifically targeted for the ESL learners. Consider the following sentence specially formed for English learners:.

"The World Health Organization this week declared the first pandemic, or worldwide spread, of influenza in forty-one years." ("Industry Gathers for Paris Air Show at a Rough Time" in Voice of America (VOA) Special English)

The sentence adds extra explanation ("worldwide spread") to help learners better understand the word "pandemic", but also gives learners opportunity to learn the new word (instead of simply replacing the difficult one).

In my select listening materials, three strategies are used to help learners understand the listening materials and learn a new language: "directly explain", "check understanding" and "change context".

① Directly explain

It means that in the listening material, a direct definition of the meaning is offered to explain the difficult word. For example, in the lesson "Bad choices", there is a direct explanation of the word "paranoid":

"Paranoid means you are scared of everybody and everything, and you think everybody wants to cheat you or hurt you." ("Bad choices" in Effortless English)

② Check understanding

It means that by answering questions and checking the answers, learners can check if their understanding of the word is right. For example, in the lesson "Bad choices", we hear the following ask and answer questions:

"He becomes paranoid. Does he think Tom wants to hurt him? Yes, he does. Does Tom really want to hurt him? No, Tom still likes him, but he is paranoid." ("Bad choices" in Effortless English)

③ Change context

It means that the listening material contains the same word in different context, so learners can understand the word through different examples. For example, in the lesson "Bad choices" (in Effortless English):

First, we can hear the word "paranoid" in the letter from the woman who needs advice on her relationship with her boyfriend – "Am I being paranoid and need to trust him?" Then, we hear it again in a story about a soccer player – "He becomes paranoid and he won't leave the house even to play soccer."

(3). Attractive

In this study, I selected attractive listening materials based on the following perspectives:

① Up-to-date

For example, the latest news, world events, hot issues, the most recent discoveries in medicine and science, economic news report such as economic crisis, reforms in financial supervision, etc.

② Useful in solving our communication problems

Such as conversations at the airport, in the restaurant, at the hotel, etc.

③ Related to our lives

Such as discussions on family issues, life problems and relationship with our family members and neighbours, a new study on smoking and the risk to women's lungs, a new report about the link between the alcohol flushing effect and cancer, a research linking optimistic feelings and longer life, a simpler way to save a life and reduce the risk of brain damage if a person suddenly collapsed unconscious on the ground, etc.

④ Thought-provoking

For example, how the city of Pittsburgh successfully rebuilt itself from financial crisis and "the hell with the lid off", the lives of important American persons such as King of Pop Michael Jackson, great jazz musician Charlie Parker, famous female pilot and writer Anne Morrow Lindbergh, cultural difference regarding some issues (such as consensual crime), etc.

⑤ Authentic cultural contexts

Such as modern changes on the expectations of mother and father in America, the story about the Statue of Liberty, the problems Americans have in their daily lives, etc.

⑥ Intriguing literature

Such as short stories written by Mark Twain, O. Henry, Jack London (specially adapted for English learners).

It is noteworthy that just like the discussion on comprehensibility, attractiveness also depends on the learner. Interests can vary enormously from different people. Some people may have very particular interests.

(4). Covering Varieties of Forms and Topics

VOA special English has a variety of subjects such as health report, economic report, world news, short stories, famous people in America, American culture, and words and phrases especially for ESL learners.

Effortless English also contains many interesting subjects related to our lives, such as topics on people making bad choices in their lives, families and individuals, double standard for men and women, intercultural marriage, custody of children, respect for other people, relationship with our neighbors, etc.

Travel English includes many specific scenarios we may encounter while we are traveling, at the airport, on the plane, at the hotel, at the restaurant, shopping, sightseeing, etc.

I also tried to cover different forms of listening materials, like written English (Voice of America (VOA) Special English) and conversational English (Effortless English and Travel English)

Next, I demonstrate the different features of the three sources of materials: VOA Special English, Effortless English and Travel English.

(1). Voice of America (VOA) Special English

VOA Special English has special features of "live topics", "written with simple English" and "read at a slower pace".

① Live Topics

VOA Special English program covers a variety of interesting and up-to-date topics including the latest news from around the world, the report on development and agriculture, health and medicine, education and economics, stories about life in the United States, news about science and technologies, American history and modern life, American popular culture and influential Americans, American idioms and short stories.

It is specifically designed to communicate with people whose native language is not English in clear and simple English. Nowadays, transcripts of radio broadcast are posted on the web site every day, along with the matching MP3 downloadable audio files. As it is described on its website,

> It helps people learn American English while they learn about American life and stay informed about world news and developments in science. It provides listeners with information they cannot find elsewhere.
> (http://www.voanews.com/specialenglish/about_special_english.cfm)

The live topics of VOA Special English program make it capable of attracting learners for a long time, even for lifelong English learning. In fact, from the comments of their members, I learned that many listeners consider it as a part of their lives, and some people have kept listening to it for more than 20 years (e.g., Surung Manullang from Indonesia has been a VOA listener since 1984 (http://www.voanews.com/specialenglish/photo_gallery_audience8.cfm).

② Written with Simple English

On VOA Special English program, the articles and reports are written with simple English. For instance, those famous short stories are all adapted into special English with short sentences and limited vocabulary.

③ Read at a Slower Pace

VOA special English announcers read at a slower pace, about two-thirds the speed of regular broadcast. With English learners in mind, they read slowly, clearly and with more pronounced intonation. This helps people hear each word clearly. As I pointed out before, separating input into words or phrases that may be manageable by the learner is a challenge for many ESL listeners. This directly influences their following understanding and analyzing.

In the beginning, critics at the time said the method of Special English would never work. American embassies demanded that the program be cancelled. However, listeners highly praised it. Quickly, it became very popular on VOA, and nobody could deny the value of the method any more.

(2). Effortless English

Effortless English is a course focusing on improving speaking and listening skills. It selects the authentic content, advocates learning from listening, and encourages repetition and active learning.

According to Milton's (2002) statement – good language learning materials can last sufficient time and provide sufficient meaningful repetition and recycling of learning materials for learning to take place. Effortless English is a great course that skillfully translates several learning theories into practice to help learners repeat listening, such as "built-in repetition" and "active repetition" illustrated below.

① Built-in Repetition

Repeating the same content again and again can be boring, therefore not effective. The repetition in Effortless English course occurs naturally and intentionally.

For example, in the lesson "Greek Family", the teacher reads a letter from an advice column in the newspaper as follows:

> DEAR ABBY:
>
> I married a Greek man whose family never accepted me. Being young and naive, I tried everything to fit in, converting from Catholicism to the Greek Orthodox faith, attending all family functions, including them in our lives. It was never enough.
>
> My husband and I traveled to Crete with his family to visit his relatives there, and some extended family members refused to share the dinner table with me because I was not Greek. One of those family members was a priest!

Our daughter, Athena, was born four years later. What broke the camel's back for me was a Christmas dinner when she was 6. My father-in-law gave cards with $100 to all the grandchildren of Greek heritage. Athena received nothing and cried for hours wanting to know why her grandfather didn't love her. My husband just tried to stay neutral.

Abby, how far should someone have to go to fit in with their husband's family?

– IRISH AGAIN IN NEW HAMPSHIRE

Then the teacher makes up a little story using the new key words and phrases as follows,

I'm walking down the street when a guy comes to me and says "hi, can I chat with you for a moment?"

He looks clean and very neat. I'm quite naive so I think he's just friendly. I say "okay".

The man asks me, "How far would you go to save yourself?"

I say "What do you mean?"

He says "I'm talking about the Christian faith. I want you to convert to Christianity."

"Actually, I'm a Buddhist" I say.

"What about your relatives? Are they Buddhists too?" he asks.

I tell him "No, just me".

He then tells me that I will go to hell if I don't convert. He says I am a bad person. He tells me all Buddhists will go to hell. Finally, he says that the Buddha and all Buddhists serve the devil. That's the straw that breaks the camel's back. I yell at him "Go away... I refuse to listen to you anymore."

In this way, Effortless English deliberately designs built-in repetitive features into listening materials. In addition, I gave participants three/four months to listen to all of the materials, which allowed them to listen repeatedly to the materials in which they were interested.

② Active Repetition

Unlike other listening materials, the stories in Effortless English course are not simply told by the teacher. Instead, the tutor constantly asks relevant questions about the stories, aiming to help learners to actively participate in thinking in English by answering questions instead of passively listening.

For example, after telling the above story, the teacher asks and answers many simple questions like the following:

Is he talking about his religion?

Yes, exactly right. He's talking about the Christian faith. He's talking about the Christian religion.

What faith is he talking about?

Well, he's talking about the Christian faith.

By prompting listeners to answer such simple questions, learners can be kept alert at listening. At the same time, they repeat the target learning (in this case, the word "faith") several times in a more interesting way.

③ Conversational English

Another important feature of Effortless English is that it contains much of the spoken language, which my participants wanted to learn more.

In Effortless English, many articles are taken from the famous advice column in American newspaper (like the above example "Greek Family"). The contents are interesting because they reflect the present American life and culture. The language is conversational and casual, using common conversational phrases, idioms and slang. For example, "my gut tells me it was her" ("Bad Choices"), "What broke the camel's back for

me was a Christmas dinner when she was 6" ("Greek Family"), "Stick it out with my husband or take the chance of losing my son" ("Lost Custody"), etc.

In addition, after reading, the teacher, in Effortless English explains the story like in real speech, speaking rapidly and using contractions like "We're gonna talk about the story" (instead of we are going to...) ("Bad Choices").

(3). Travel English

Travel English is rooted on another important notion of learning – situated learning. The designer hopes to use genuinely relevant learning materials to capture learners' motivation and produce better learning results in the authentic context where the language is used. Learners can be motivated by materials which replicate as much as possible the situations which learners might encounter during their travel abroad. This idea is quite helpful when considering mobile learning, which can refine anywhere anytime learning into on-the-spot learning.

For example, the chapter "At the hotel" includes the dialogues such as room reservation, check in, hotel service, depositing valuables, complaints, suffering from theft, wake-up service, check out, etc. We can imagine, during travelling, with such learning materials on hand, learners might have more confidence to initiate a conversation with native English speakers, which create more learning opportunities for them.

After each conversation, there is a repetition of useful words and expressions. This feature also serves as assistance for learners to repeat and recycle the newly learned material.

# # #

So, I designed the above Mobile English Listening System as one way to attempt to answer the first research question – "How can educators use the portability of personal mobile devices to help adult ESL learners?" We can use the mobile technologies to facilitate repeated listening activity.

To explore the second research question – "How does the portability of mobile devices facilitate adult ESL learning?" I conducted the second detailed interviews after three/four months. In the next section, I analyze the second part of interview data concerning participants' feelings and thoughts after experiencing the above listening materials in m-learning environment.

4.3 The Second Interviews

In November and December of 2009 (about three/four months later), I conducted the second interviews with the participants. This time, I focused on the experiences with using the Mobile English Listening System I provided for them. I further explored the quality of the listening materials and the process of mobile listening.

4.3.1 Findings of the Interviews

The general themes classified in these interviews include: ① listening materials in m-learning, ② process of repeated mobile listening and ③ limitations of the system.

Theme one: Listening Materials in M-learning

In this theme, I borrowed the concise comment from Dr. Hanan Yaniv on mobile technologies, and synthesized that good mobile learning materials could be "just enough", "just for me", and "just in time" (Yaniv, personal communication, June 10, 2009). Following data gathered in the interviews supported these important features of good mobile listening materials:

"Just Enough" – the repeated listening material suitable to be learned anywhere anytime should be short, as the participants commented:

- Short materials are suitable for mobile listening; while I am driving, cooking, cleaning, folding laundries, waiting... It is much easier for me to concentrate on listening during this short period of time (Participant E).

- Short materials are good for repeated listening, because I soon become tired of listening to the same content over and over again. I can only stand it for a few minutes (Participant A).

"Just for Me" – the listening materials should be easy to understand and attractive to individual learners, as participant E commented:

> The content of VOA special English program is fantastic. It helps me stay informed about world news and developments in science, which makes me unable to give it up (Participant E).

Yet, there were other participants noting that the topics of VOA special English like economics did not interest them because they seem to be removed from their daily lives. They expressed the hope to combine English learning with their current daily life. For example, while taking care of little kids at home, they have an interest in topics on parenting; during long weekend, they may want more information on cooking, on traveling. There were other special interests mentioned by the participants, such as sports, music, arts... etc.

Fortunately, nowadays, it is not hard to find materials catering to individual needs on the Internet with the live English language.

Following are other features that the participants detailed which met their needs in my listening materials, such as simple, slow and repetitive.

- The articles in VOA Special English are written with simple, common vocabulary. Most words fall within my vocabulary range. Therefore, I can focus on the word choice, the pronunciation, stress and intonation of the speech which are my main weakness at present (Participant E).

- I like the slow conversation in Travel English because I can read along with them. I think this is good for improving my pronunciation (Participant B).

- During repeatedly listening to Effortless English, I had opportunity to feel each word, paying attention to every aspect of the word, meaning, pronunciation, spelling... making comparisons with my experience of using it, not only limited in understanding its current use in the material (Participant D).

"Just in Time" – mobile technology can make learning take place in the environment where it is just needed (situated learning):

> I took the Travel English with me on my vacation. It helped me a lot and helped me fill the boring waiting time during traveling (Participant E).

In the next chapter, I give further suggestions regarding situated learning.

Theme two: Process of Repeated Mobile Listening

The same input can produce different results if processed differently. It was necessary for me to further explore the process of repeatedly listening to these materials, which became my theme two: process of repeated mobile listening.

In this theme, the participants commented on designs to help increase both quantity (repeating naturally, easing boredom) and quality (active participating and advancing from semantic comprehension to syntactic comprehension) of the repeated listening activity.

They welcomed the features represented in my select listening material which made them repeat naturally.

> I like the method in Effortless English. It is easy to concentrate on listening if material is new to me. The materials in Effortless English help me repeat the key phrases in different stories. So just listen once, then they are repeated and recycled many times without knowing (Participant D).

Our participants mentioned other good ideas such as using English songs to make repetition natural and interesting.

They also noticed that the mobile learning environment which was relaxed and short time learning could ease their feeling of boredom while repeating.

- I felt that only with my MP3 player while on the move (while driving, exercising...), I am able to listen to the same English materials again and again. On the contrary, if they let me sit at the table, I would quickly grow tired of repetition because I already know that stuff (Participant E).

- I don't think mobile learning is better for learning new content. But it is good to use mobile devices to squeeze repeated review and practice into any convenient short time at any convenient place (Participant A).

They valued the active activity in Effortless English which could help hold their attention all the time while repeating.

> Whenever I made mistakes in answering those simple questions, it reminded me that I was absent-minded, and that helped me focus on what I am saying while answering questions (Participant E).

Repeated listening activity could help participants progress from semantic comprehension (at the level of understanding the general meaning) to syntactic comprehension (at the level for producing target language), getting rid of the dependence on (at the same time the interference of) their native language:

> At first, I needed to translate in my mind at all times. After enough exposure and repetition, I became familiar with the content. Gradually I don't depend on translation that much (Participant D).

Theme three: Limitations of the Mobile English Listening System

While embracing new technologies and integrating them into educational practice to develop their full potential, we need to be well aware of their defectiveness. Compared with human teachers, the interviews found my Mobile English Listening System had

some limitations such as: limit the energy of the humans that can be transmitted to learners, lack the social context to help language learning and lack output.

The participants pointed out that listening to the machine limited the energy of the humans that can be transmitted to learners. Participant A had the following comment:

> When I took a great face-to-face class, the teacher's words would resound in my mind after class for a long time; but this rarely happened when listening to the recording machine. Maybe it has something to do with this kind of communication lacking other subtle paralinguistic cues involved in the interaction process, such as body language, etc (Participant A).

The energy they can feel also differed from various listening materials in this system. Although, all the participants praised the situated design idea of Travel English, they commented that the speakers are dull while reading those conversations; the speakers lack the passion. The voices of announcers in VOA special English are friendlier. The teacher in Effortless English is most energetic. This is partly due to their different content. In fact, the Effortless English teacher does not read articles from the paper. Most time, he speaks without lines.

New knowledge needs an anchor to ground with. In the literature review, I talked about the prior linguistic knowledge may serve as anchor for new knowledge. It is worthy to note that the anchor may not be limited only to linguistic knowledge. In fact, in authentic context, many environmental conditions and social associations contribute to help learners process the particular language data being input as well. Authentic context provides social clues to help understanding, mapping and memorizing the language material, as commented as follows,

> Once we rode a bus. It stopped in a snow bank and couldn't move. The bus driver shouted, "We are stuck!" The scene, the facial expression, the driver's voice and the word "stuck" went into my mind for good (Participant E).

In my system, I exemplified the idea of situated learning in the selected Travel English, and got the approval comment:

> I listened to the chapter "At the airport" from Travel English at the Calgary Airport. That learning experience was totally different, much more motivated and effective (Participant D).

But more comments showed that generally speaking, the system lacked the social context to help language learning, as following:

> Sometimes, I find it hard to concentrate on the recording and memorize the listening material even after hearing it many times. But if I hear the exact sentence in the real life, it becomes vivid and alive. It doesn't only go into my memory more easily, but can also be retrieved more easily and used in a similar context later (Participant C).

Another limit of my system, like all listening systems, is lacking output.

In the literature review, I introduced the idea that input alone is not sufficient for second language acquisition. The participants expressed the same experiences and thoughts:

- By producing, I am forced to think about the language grammatically, from selecting word forms to putting them in order, from mechanic parroting to retrieving every sound from my own memory (Participant E).
- In many cases, until I spoke out, did I realize that I was not quite sure about something (pronunciation or meaning). This made me to revisit them and master them more accurately (Participant D).

The participants also highlighted the self-correction function in output – making mistakes is a necessary step of learning. Our learned system can help us self-correct our utterance:

> At first, I made many mistakes, like using "he" when it should be "she", errors in verb forms... and only after I heard them, I realized that I made that kind of mistakes again. Later, before speaking, I could pay special attention to them. Finally, it seemed to come up correct automatically, without thinking and worrying (Participant C).

Although, in the ask-and-answer mini story unit of Effortless English, listeners are encouraged to speak out and listen to themselves. This use can hardly be considered productive.

4.3.2 Discussions of the Themes

Theme one described the features of good mobile listening materials – "just enough"/short, "just for me"/ easy to understand and attractive, and "just in time"/situated learning.

In designing the system, I placed comprehension at the center. In addition, for language learning, semantic comprehension is just the first step, and a larger part is to let those new words go deep into our mind. By decreasing the working load of vocabulary, learners might focus on fully feeling those new words and integrate all aspects of the language data into their system.

As for true situated learning, I admit that language is far more unpredictable than any learning materials. In the end, we need to learn them in the authentic context where the language is used. The idea of Travel English is to serve only to prepare learners to enter that real situated learning environment.

Theme two examined the process of repeated mobile listening on how to increase both quantity (repeating naturally, easing boredom) and quality (active participating and advancing from semantic comprehension to syntactic comprehension) of the repeated listening activity.

During discussion of the research data during needs analysis, I explained that repetition itself is capable of generating salient input (make input to be noticed), directing learners' attentional resources to different parts (help learners notice different particular aspects) and establishing strengthened positive evidence (let learners exposed to the standard English). As well it can provide confident negative evidence (help learners establish the expectations), reanalyzing input data at different levels, automatizing understanding and retrieving information from learners' knowledge base.

It is evident that repetition is a necessary learning activity in English acquisition. The idea of my system design was to use mobile devices to improve this activity. I tried to explore the process of repetition from perspectives of both quantity and quality of repetition.

How to use mobile technology to help learners listen as much as possible is my initial concern in designing the system. My selective listening materials of the system represented some techniques to build natural repetition and recycling of key words into listening materials, and to design learning activities to engage learners actively in the listening process. These methods are meant to increase the challenge of the listening activity so that learners can maintain a high level of interest. Interview data showed that these designs were enthusiastically welcomed by the participants.

However, if these features still can not solve the problem of boredom, learners still need much more repeated listening. Can the mobile environment help?

Why aren't we tired of repeatedly playing games? Researchers described the pleasures of games play as a "flow" experience (Csikszentmilalyi, 1990). They attributed this state of deep involvement to a perfect match of the challenges and players' ability. In other words, the activity should be neither too easy nor too hard.

However, for English learning, after learners comprehending the meaning of input materials, we still need repeated listening activity. The low demand of the brain's active

involvement in such activity makes it very hard to persist. In this study, I found the mobile learning environment can better address this problem.

Psychologists suggest if we are experiencing rustout (work is less than our capacity), we need to do something to increase our stress to its optimum level (Pettijohn, 2009). Then, what would happen if we use mobile devices to do the repeated listening activity?

With mobile devices, we can do this repeated listening activity while doing other things like driving, exercising, travelling, waiting..., which also requires other attentional resources. In this way, we can do many simple activities together to avoid rustout. On the one hand, listening to English can help make the time of doing routine things pass more quickly and rewardingly; on the other hand, doing repeated listening in this way makes study less boring, more relaxed and even more focused.

Thus the mobility/portability of mobile devices enables such repeated listening be taken into learners' spare time when we are doing other chores and takes the drudgery and boredom out of repetitive activities.

In the needs analysis, I pointed out that compared with learning through natural face-to-face conversation, learners must be aware of their mismatch between their inter-language and the target language while studying alone is another consideration in designing the system. The listening materials in this system demonstrated some examples of enhancing input, like answering questions, highlighting new phrases, and natural repetition.

Another big issue in examining the process of experimenting with my system concerns the native language interference for adult ESL learners.

Adult learners need to be alert, because the mapping from English to our native language can be unconscious. While listening or reading, we tend to depend on our first language to understand the second language. We like to find the corresponding word in

our first language. In other words, we activate the connection between English word and definition in our native language (Chinese in our case) every time.

If this kind of process is repeated, the result would be to keep strengthening the link between the English word and Chinese translation. By repeating, we may improve the speed of comprehending the general meaning (at the level of decoding English), but it will impede us from moving further to the deeper syntactic analysis, as a result, we will not be able to use English naturally and automatically, or, moving on to the level for encoding English.

Accordingly, I concluded that when learners reach the level of comprehension, they need to suppress the association between English and their native language. But how can we design the learning system to help learners correct this kind of unconscious mental activity? This study showed one solution to handle this issue. With the help of repetition to suppress the translation was the idea underpinning the design of my Mobile English Listening System. Through this study, I found that I could go even further to expedite the above suppression, such as "building awareness", "designing purposeful learning activities" and "replacing connections".

① Building awareness

During the first interviews, I talked with participants about the influence of one's native language on English learning, and encouraged them to think the cognitive process happening in their mind by which input data is processed.

② Designing purposeful learning activities

In the literature review, I discussed that although comprehensibility is a necessary condition, it is not a sufficient condition for learning. Put it differently, although comprehended input is a prerequisite to learning, comprehension does not guarantee our acquisition (involving being able to output successfully).

Learning materials alone can not monitor learners' learning process. Although the input may be the same, however, at different stages, learners need to focus their attention on different aspects based on their individual knowledge gap. From time to time, learners need to look into their learning methods. Do they need more exposure to help automatization (quantity of input)? Or do they need to change their learning methods of processing input to suit their changing needs (quality of processing input)? Or both?

After coming to Canada, I read and listened to large quantities of English. My English improved rapidly. Then I found it hard to make further progress. I could understand other people speaking/writing, but when I was speaking/writing, I just couldn't use the words and the structure they used to express similar meanings. It seemed that I was somehow impervious to the input.

I reflected on my learning methods and decided that it was time for me to focus more on forms (without translation) while repeating listening because my comprehension was not a big problem. But what should we do to focus on formal features instead of meaning?

Sometimes, purposeful activity can help, like the Zhong's special listening activity introduced in the literature review. I used his machine to practice his activity for a while. And now, when I listen to English, what appears in my mind is the spelling instead of Chinese definition. It is noteworthy that apart from helping suppress translation and force me to focus on words' forms, this practice also helps me to better use my reading skills to make up my weaker listening skills. There are many sight words I know whose sound is unfamiliar, and now my brain transforms the sound to the written form (the spelling) for me to see in my mind. This is also true for many adult learners when they become increasingly better as visual learners than audio learners.

Inspired by Zhong's activity, we might propose that adding listen-and-repeat activity in order to help learners focus on forms during mobile English listening. We might have the experience that reading out and listening to ourselves is helpful to direct our

attention to forms. However, I do not think, listen-and-repeat works very well; I can listen and repeat after the speaker, but it is hard to go into my mind. I still can't use them when I want to speak.

It seems that only listen-and-repeat demand too little attentional resources and initiate limited brain's activity, especially when learners only mechanically repeat, without consciously paying attention on special aspects, such as the difference of the pronunciation between the speaker's and ours, the change of the verb tense, etc.

The designer of Effortless English proposes another technique. He asks simple questions to make learners' minds stay alert all the time. Learners need to make minor changes to answer questions. The questions are very simple. They are not meant to test learners' comprehension. The purpose is to help learners use the language in a more meaningful way instead of mechanical repetition. And the simplicity just serves to help learners to focus on forms and suppress translation when comprehension is no problem.

For example, the following is quoted from "Bad Choices" (in Effortless English):

> So he moves to Hollywood. He hooks up with Tom Cruise.
>
> Dose he meet Tom Cruise? Yes, he meets Tom Cruise.
>
> Does he hook up with John Travolta? No, he doesn't hook up with John Travolta.
>
> Does he hook up with Julia Roberts? No, he doesn't hook up with Julia Roberts.
>
> Does he hook up with Tom Cruise? Yes, he does, of course.
>
> Does he hook up with Julia Roberts or Tom Cruise? He hooks up with Tom Cruise.

In order to answer these simple questions, learners need to re-arrange the sequence of words to make new sentences. We also need to make minor changes in the verb forms to respond to different questions. This process requires more attentional resources and helps make input go deeper into learners' mind.

③ Replacing connections

Please note that the above activity works on the condition that comprehension is no problem for learners. But if learners still have problems to understand, when we listen to some words, we still need to associate them with other things easier to understand (i.e., anchor). We should replace the connection between English words and their Chinese translations with the connection between English words and their English definitions as soon as possible.

In Effortless English, the first unit in every lesson pack is the vocabulary unit. The teacher uses simple English to explain the meaning of key phrases to help learners understand them. In this way, later when listening to the rest of the units, if learners still need to find meanings of unfamiliar word, what comes into our minds is the English definition. It is more accurate, and when we can't remember some difficult words while speaking, we can directly use English definitions to explain them, being able to express the same basic idea and think with English.

Extending this idea, I maintained that learners should use an ordinary English dictionary to replace their bilingual one as early as possible.

Here we can see that although repetition comes from the same input, learners' different focus may lead to different analysis and acquisition. Learners need to focus their attention on their ever-changing knowledge gap and make every repetition meaningful for their learning. I exemplified how to realize this idea by designing purposeful listening activities and providing appropriate learning tools. In the last chapter, I suggest other ways to help learners fully aware of this point and make conscious effort to process the same input materials to meet their individual needs.

Theme three showed the limitations of the mobile English listening system found in the interviews including: limit the energy of the humans that can be transmitted to learners, lack the social context to help language learning and lack output.

Here, based on my observation and experience, I would like to add two more limitations in my system – lack learning tools and only suitable to some special learner group.

Although I positioned the Mobile English Listening System on the basis of learners' semantic comprehension, the process of comprehension is not a simple linear one. With new input and continual change in the learners system, it is very common that the words comprehended may become uncertain and need to be reanalyzed. To help this reanalysis, there should be reliable tools on hand.

When learners enter into authentic context or combine natural face-to-face interaction with mobile learning, they need in-time support to help real situated learning take place.

When discussing the function of conversational interaction or negotiation of meaning, a catalyst for change, in order for the learning to take place, learners need to search for additional information to analyze their conversational problem. If the additional input is not available, learners do not have the opportunity to analyze the storage input. Then this kind of input data will be forgotten. Therefore, in order to take real advantage of conversation, learners need to seek relevant additional information in time.

But my current learning system lacks learning tools. This is one limitation.

In second language acquisition, there is no universal agreement on any theory, optimal method or effective technique. As a practitioner, I hope to be informed by all kinds of theories, because they can equip me with multiple perspectives and insights in understanding the area of SLA. While in practical application, I hope to be guided by any theory or perspective as long as it works.

I still remember when my nephew began to learn English in elementary school at the age of ten in China. It seemed that his English teacher adopted the oral approach based on cognitive theory. During the entire class, the teacher spoke English from the beginning to the end using mime, pictures or gestures, hoping to induce students' spontaneous use of oral language. However, in order to help his memorizing the

pronunciation, my nephew wrote Chinese characters which seemed to sound similar beside each English word. You can imagine his pronunciation! When I noticed that after a long time, his pronunciation was still poor; I had to teach him the phonetic symbols and ask him to rote memorize them (behaviorist memorization). Then use these symbols to help him memorize the pronunciation of English words.

But in Canada, for the ten-year-old daughter of my neighbor who just came from China, it was a different story. She has the opportunity to be exposed to English in authentic context in adequate time everyday in elementary school. Now her pronunciation is much more natural than ours and doesn't need any aid to help her memorize. For her, it is obvious that simple exposure and the direct method works the best. But her problem is she has quickly forgotten her Chinese pronunciation. Now she sounds like a foreigner when speaking Chinese.

Therefore, different theories and technologies should be chosen and used in different situations. My system was designed and tested by a particular group of participants; the findings might be greatly limited to the target population in this study. For example, my participants and I can't understand how some adult immigrants can speak English fluently like native-speakers, but they cannot read and write at all. They definitely need different learning theories and learning systems to address their different learning needs.

In the last chapter, I give my suggestions addressing each of above limitations respectively.

From two interviews, I got the answers to my research questions: How can educators use the portability of personal mobile devices to help adult ESL learners? How does the portability of mobile devices facilitate adult ESL learning? – With portability of personal mobile devices, repeated listening activity can be less boring thus more effective, by being taken into learners' spare time and combined with doing other chores. Mobile technologies can also make it possible for learning to take place in the environment

where it is just needed (situated learning). In the last chapter, I suggest other ways to answer my research questions.

4.4 Summary

This chapter presented the detailed findings of the study. It described the first interviews as a needs analysis, which included three main themes: ① adult English learning is different from children learning language, ② learning activities and ③ learning materials in m-learning. The analysis provided the rationales for my Mobile English Listening System design, offered the guidelines to select mobile listening materials and made clear challenges to address in designing. Then I introduced my Mobile English Listening System used in this study, including the purpose of the system, and the features of the select mobile listening materials (including the common features and different features of three sources of materials: VOA Special English, Effortless English and Travel English). In the end, I described the findings and discussions of the second interviews after the participants experimenting with the system three/four months later, and the main themes classified in these interviews included: ① listening materials in m-learning (just enough, just for me, and just in time), ② process of repeated mobile listening (from perspectives of both quantity and quality of repetition) and ③ limitations of the system (such as lack the energy of humans, lack the social context, lack output, lack learning tools, only suitable to some special learner group).

CHAPTER FIVE: SUGGESTIONS ON ADULT ESL M-LEARNING

In the previous chapters, I introduced our experiment with the Mobile English Listening System, with an intention to find ways to take advantage of the existing technologies. I focused primarily on the theories, materials, and experiences on using simple mobile devices to learn English by listening.

In this chapter, I discuss some general suggestions based on research data, explain my way of approaching mobile English learning to address the gap I identified in some existing ESL m-learning research. I further explore ideas based on other functions offered by more powerful mobile devices (like mobile phones) as addition of other ways to use the portability of personal mobile devices to help adult ESL learners, and try to position my thinking within the continual development of educational theory, practice and technologies. In the end, I point out the limitations of this study to inform the further study.

5.1 The Way of Approaching Mobile English Learning

In this thesis, I demonstrated my way of approaching mobile English learning which can be illustrated in the following diagram.

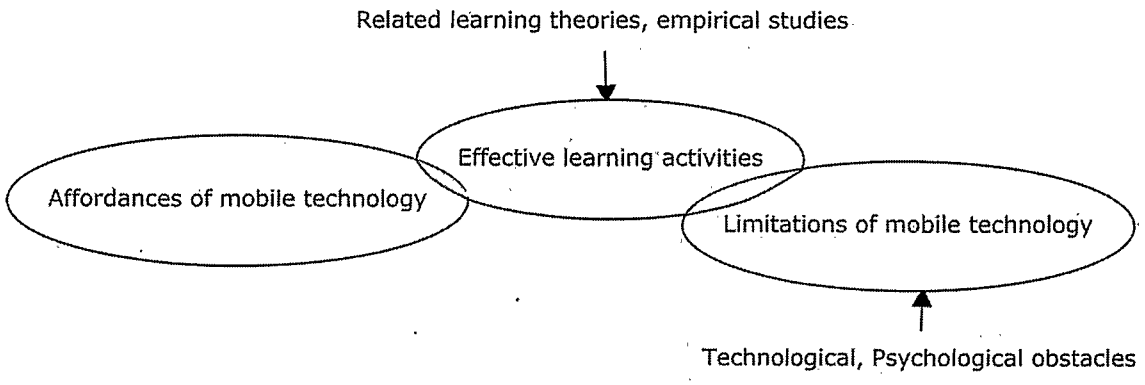

Figure 6: The Way of Approaching Mobile English Learning

The following is the detailed explanation:

Regarding "Affordances of mobile technology" and "Limitations of mobile technology":

Compared to today's desktop computers, mobile devices have limited displays, restricted input methods, and low rates of connectivity. Therefore, at this time, I decided to focus on portability affordance and voice function only.

Regarding "Effective learning activities":

Informed by related learning theories and empirical studies, from the data collected at the first interviews (needs analysis), I found that repeated listening is an essential part but can not be well addressed in traditional classroom learning. Then I targeted the Mobile English Listening System to frequent repetition of listening learners need after they comprehend the meaning of input materials.

Adult ESL learners commonly comment on the boredom of repeated listening activity. We all know after understanding the learning materials, we still need repeated listening to memorize new words, make language automatic, and help gain fluency, but the redundant data is disengaging. And repeating is just not easy for normal adult learners to persevere in. It seems that the challenge not only comes from the language itself, but also from struggling to engage learners. I hope that using the mobility/portability of mobile devices to address this problem results in improved repeated listening activities. Compared with extensive reading, repeated listening does not require so much concentration on the activity, and short learning materials do not require a long continuous periods of time either.

In summary, this is how I aimed at the overlap of technical affordances (voice function, mobility/portability feature) and effective activities (repeated listening after semantic comprehension). Considering the characteristic of mobile learning environment, I organized the listening materials in little fragments, in order for learners to include

listening activity in their daily lives at different times (for example, listen to the material about 10 minutes each time).

With the above illustration of my way of thinking, let us re-examine the two research studies reviewed in the literature review.

Thornton and Houser (2005) proposed effective learning activities (e.g., interval regular learning). Research on memory and learning suggested that for an item to be stored in long-term memory, distributed practice is superior to massed practice. Cognitive psychologists have found that when two presentations of stimulus are close together (i.e., massed presentation), the improvement in memory performance, compared with a single presentation, is limited. On the other hand, when two presentations of a stimulus are farther apart (i.e., spaced presentation), then performance on a memory test is significantly better than performance after a single presentation. The advantage in memory performance that occurs when two presentations are spaced instead of massed was referred to as the "spacing effect" (Thornton & Houser, 2004, p. 6).

However, Thornton & Houser didn't capitalize on the unique affordances of mobile technologies (e.g., anytime, anywhere). Learning new words needs learners' concentration and was not suitable to be done anytime, anywhere for most of their participants. Therefore their results showed that the utilization of the mobile technologies did not facilitate learners to strictly follow the carefully planned learning design (a spaced and scheduled pattern of learning).

Stockwell (2007) examined the use of a prototype intelligent vocabulary tutor system on mobile phones, but found students' clear preference for carrying out the assigned vocabulary tasks on the computer as compared to the mobile phone. It is true that technological and psychological limitations are barriers in m-learning. Here I would like to add another dimension, namely pedagogical design appropriate in a mobile learning environment; perhaps we need to find different forms of learning activities than computer-based ones (i.e., effective learning activities suitable for mobile learning). In

fact, all of Stockwell's vocabulary tasks were reading/writing tasks. Compared to the desktop computer, they were not suitable for mobile phones due to their limited displays and restricted input methods.

As Hinkelman (2005) commented, traditional CALL (Computer Assisted Language Learning) has often looked at language learning more from a technological perspective and less from a pedagogical view. In this study, I suggest, in designing ESL m-learning, to determine the overlap of technical affordances and effective learning activities. That is, to design effective activities based on the affordances and limitations of mobile technologies.

It is noteworthy that in determining the overlap, we should also keep in mind that both pedagogical knowledge and mobile technologies keep evolving and changing. Prensky (2005) pointed out another perspective to consider the limitations being identified today. In his words, cell phones complement "the short-burst, casual, multitasking style of today's digital native learners" (p. 2). Although my study was targeted at Chinese adult ESL learners who were digital immigrants, the same learner-centered way of utilizing educational technologies could be found throughout the research design.

Guided by the constructivist theory, my intention with the study was to go beyond the common input-output research design on computer-assisted language learning. As another effort for this study to jump out of the input-output design, rather than just determine whether or not those learning activities/materials in the system are superior to other methods, I hope to further explore some general theoretical perspectives as suggestions on this emergent learning environment as follows, rather than limiting myself only to the simple system experimented with in this study.

5.2 Suggestions on Adult ESL Learning through More Powerful Mobile Devices

Language teaching has a history of adopting every possible technical innovation, in an effort to improve the quality and success of teaching – from the printing press to the Internet. Technology is, and always has been, an integral part of language teaching

(Milton, 2002). With the fast increasing utility and dropping prices, powerful mobile technologies like mobile phones are increasingly valued by more and more researchers. They believe that mobile phones hold a big potential in the future ESL m-learning.

On the side of technological development of mobile phones, as Prensky (2005) pointed out, the major features of mobile phones include voice, short messaging service (SMS), graphics, user-controlled operating systems, downloadables, browsers, camera functions (still and video), and geopositioning — with new features such as fingerprint readers, sensors, and voice recognition being added every day. In addition, optional hardware and software accessories are available as both input mechanisms (e.g., thumb keyboards and styli) and optional output systems (e.g., plug-in screens and headphones).

On the other side of theories on SLA, there is so much variation in describing what should be taught. There is also considerable variation in how to learn it. No universal agreement about the nature of second language learning/teaching (even about the nature of language) can give rise to a single, optimal method and set of techniques for learning foreign languages (Milton, 2002).

In fact, most teachers try to be eclectic in their teaching practice and use whatever method works for their targeted individuals, at some point in time, in some contexts – from repetition and corrective feedback, to social interaction and assimilation of other's speech, from structured instruction, to attention to form in contexts of real language use, from mastery of prescriptive norm, to negotiation of meaning...

In the literature review, I reviewed the history of the educational use of computers and the development of theoretical perspectives and corresponding applications in SLA. This was not intending to compare each other and determine the only optimal paradigm. I see each new perspective as an addition to the previous set, and we should not completely retire the old ones to adopt the new one.

In practical use, taking into consideration the various variables of learning environment, learners' individual needs, learning styles (including the influence of different culture of

learning and educational system), we may find that all the perspectives introduced have place in certain circumstances.

Accordingly, to fully utilize the educational potential affordances of increasingly powerful mobile devices, I synthesize the following three categories of suggestions based on various teaching theories from those different perspectives: using mobile technologies as a medium, as a processor and as an environment.

5.2.1 As a Medium to Deliver Learning Materials and Enhance Input

Mobile technologies can deliver information in variety of formats: printed text, pictures, audio, video, multimedia... With the feature of connectivity, mobile devices can be connected to World Wide Web, which represents a revolutionary new medium – globally-linked hypertext and hypermedia. An online learning environment provides access and distribution of a wide range of authentic content (text-based, visual graphic, video and audio) in the target language, which has the potential to engage multiple brain channels.

In this study, the perspective of delivery to the learner was my main focus. I introduced the global accessible learning resources to learners, and guided their thinking to informal lifelong English learning. Keeping in mind of the mobile learning environment and the characteristics of devices (limited display screen and input method), I designed a listening system with the aim to improve adult ESL learners' listening and speaking.

I found the features of good mobile listening materials are as follows:

① Just Enough (short)

② Just for Me (easy to understand and attractive)

③ Just in Time (situated)

I further discussed:

① How to help learners repeat more – such as building natural repetition and recycling of key words into the listening materials, designing activities to engage learners to actively participate in the listening process, listening on the move.
② How to enhance input and bring mismatch to learner's attention – such as answering questions, highlighting new phrases, and natural repetition.
③ How to help learners aware of their mental process of learning and make adjustments to meet their individual learning needs – such as building awareness, designing purposeful learning activities and replacing connections.

I found my Mobile English Listening System had some limitations such as a limit to the energy of the humans that can be transmitted to learners, a lack of the social context to help language learning, a lack of output, a lack of learning tools and only suitable to some special learner group.

The following are my suggestions addressing each limitation respectively:

① A limit to the Energy of the Humans That Can Be Transmitted to Learners

It must be admitted that human-to-human interaction is a more natural and effective way to make learners alert, and make the input message salient. Therefore, I suggest the combination of authentic face-to-face interaction and mobile listening system self learning (blended learning).

② A lack of the Social Context to Help Language Learning

To acquire a foreign language, an important notion is to "feel" the language, which means understanding at the linguistic level only is not enough; learners need to assimilate it into their thoughts and their feelings, using all their senses to experience the language use. Authentic context can help develop these feelings. To better facilitate activating future use of language, besides the mapping of language and its meaning, the storage of the connections of context clues is also important.

Therefore, I recommend more situated learning than exemplified in the select Travel English. I hope with the portability of mobile devices, English learning can be brought into authentic context where the learning can take place when it is needed on-the-spot.

③ A Lack of Output

Lacking output and interaction is a limit of all listening systems. Therefore, I need to make it clear that the listening system can only deal with some problems that some learner groups face at certain stages. It should be considered only to complement a more comprehensive learning process.

④ A Lack of Learning Tools

For example, I noticed that there was an English dictionary in my participant's bathroom. This observation led to the suggestion of one of the necessary learning tools – a dictionary installed on mobile devices (as I discussed before, I strongly recommend an ordinary English dictionary).

I know many students in China, who are working extremely hard at learning English. They challenge their persistence and determination by memorizing the entire dictionary – unfortunately, an English-Chinese dictionary. This is a method I criticized during the discussion on first interviews. From this, we can see apart from learning materials, the learning tools and learning methods are also important in language learning. This also brings out my next suggestion on using technologies to enhance learning.

We can also organize a database of practical conversations of the situations which learners most likely encounter, to provide vocabulary and structures which learners might need, and to offer searching functions in the mobile system to help learners easily locate/retrieve relevant particular exemplars.

In designing these tools in mobile devices, I suggest adding alternative input method such as voice recognition, adding an editing function to customize individualized learning, adding pronunciation output, recommended entry, etc. In doing so, learners

may easily get relevant in-time feedback to help make input more effective and maximize integration.

⑤ Only Suitable to Some Special Learner Group

I believe to really get the benefits and fully develop the potential of technologies; theories and technologies should be wisely chosen and used based on the learning objectives, learners' characteristics, particular context (e.g., influences, conditions), etc.

In the literature review, there were also suggestions made by other researchers on English m-learning about some helpful features which may be used in delivering learning materials:

① Push media (using this delivery mode to produce some pressure for learners)
② Distributed practicing (with appropriate spacing in the pattern of delivery) (Thornton & Houser, 2004, 2005)

5.2.2 As a Processor to Help Learners Process Information and Construct Knowledge

Prensky (2005) reminded us: today's high-end cell phones have the computing power of a mid-1990s personal computer. Even the simplest, voice-only phones have more complex and powerful chips than the 1969 on-board computer that landed a spaceship on the moon. Besides their communication features, mobile phones have expanded to other functions. The increasingly available memory in mobile devices makes them capable of running more complex software or performing more complex tasks.

Using the processing capacities of media, we can help to influence the structure, formation and modification of mental models (Kozma, 1991). Although we do not know what the exact picture of our mental representations for the English language is – how our English knowledge base receives, stores, organizes, retrieves and transforms information. We are able to accurately identify which tools and learning activities work well – in improving our understanding, and our speaking, etc.

Mobile devices give us an opportunity to have learners embedded in a realistic context, at the same time it should also offer access to supporting tools. In the previous suggestion, I recommended some learning tools from the standpoint of delivering medium. Here, from the perspective of processor, mobile devices can be a tool for the active manipulation of input information. The following are some ideas.

(1). Personalized phrase book

In examining limitations of the Mobile English Listening System, I discussed that for ESL learners, English vocabulary should be stored in a meaningful context. For example, the sound, the image, the scene, the feeling, or for more abstract vocabulary, its English definition and the English sentence examples for its typical uses all provide helpful contexts which may be stored in learners' mind in connection with the target vocabulary.

Here, I suggest developing functions of creating phrase books in mobile devices to help learners edit, add, modify their own associational links/relationships of English vocabulary.

For example, learners may find it helpful to create their own individual phrase book when learning difficult phrases. They write down the entire phrase instead of only a single word when they decide to learn it. Then, whenever they see the phrase in their phrase book, they can remember the vivid picture of the story from which it came, their feelings while reading it, the context and situation where it was used... all this extra rich information helps their learning. Because of the scope of detail and relationships the environment provides, learners are likely to find many ways to connect their new words to their existing representation (not only limited to linguistic representation). These various connections, in turn, increase the likelihood that similar situations in the real world will activate this word in the future, to help retrieve the word appropriately when producing.

There exist varieties of dictionaries to help learn vocabulary, like thesaurus, antonyms, which attempt to reflect the structure of our mental representation. But many times, I

found other associational links in my mind. For example, when I heard "recline the seat", I had no difficulty understanding its meaning. But when I was going to express the same meaning, I used the word "decline". By checking the dictionary; I learned that I confused these two words. In my personal phrase book, I can put them side by side, and remember them together. I review them together until I can separate them correctly.

This is the phrase book exclusive to me, because the phrases are from the text I read, and the organization is to help me refine my mental model, correct mistakes which may be specific to me. And it is dynamic, it keeps evolving through a continual reoccurring learning process (as the learner receives more input and revise/modify the hypothesis).

To develop such handy personalized phrase book, many functions should be considered, for example, input method, search function, edit function, etc.

(2). Using recording to take note

In the literature review, I described some inputs that are put into storage because of a lack of enough information to confirm or disconfirm the hypothesis.

The findings and discussion of first interviews confirmed the point that conversation serves as a catalyst for change. Learners who are provided with information about incorrect forms are able to direct their specific attention on these particular aspects. More importantly, learners need to search for additional confirmatory or disconfirmatory evidence before they forget them to make learning take place.

Due to the capacity of human memory, we can assume it is more likely that learners can store a limited amount of information, for a short period of time.

In addressing the limitation of my listening system, I recommended the blended learning (combination of authentic face-to-face interaction with mobile listening system learning) and situated learning (i.e., bringing English learning into authentic context). In this learning environment, learning materials are not delivered to learners clearly. Learners need to gather them by themselves. A handy mobile note-taking tool may be helpful.

Therefore, I suggest using mobile technologies to extend learners' memory – recording notes. By helping learners store useful input until they find the relevant additional information through a variety of sources later on, more input data can be processed and used in the development of learners' language system.

We can imagine, with this recording function of mobile devices in our hands, we can record varieties of information – on the signs while traveling along the streets, walking around the park, free conversation, etc... This way, we can make use of more possible learning opportunities. The recording can also be re-visited for deeper reflection and review.

This technology is not new. I have seen some ESL students use recording devices to record the teacher's presentation in the classroom. But fewer use them in other activities in their lives, like shopping, travelling, playing... It seems that many learners do not realize that informal learning (outside their dedicated learning environment and formal curriculum) should play an important part in their second language acquisition. In fact, this kind of mobile second language learning may be more effective and interesting.

Informal learning is an important notion in mobile learning. Because of the portable and personal nature of mobile technologies, mobile devices can be ubiquitous assistants in any unpredicted learning episodes.

As Naismith et al. (2004) pointed out non-formal activities can be along a continuum of the learner's intent, with the explicit/deliberate learning on one end and implicit/accidental learning on the other. In the next suggestion, I discuss how to help raise learners' awareness and encourage intentional informal language learning.

(3). Recording for self-awareness, self-diagnosis and self-correction

Interaction or negotiation creates a helpful environment by making learners pay attention to the linguistic form of the message. But the claim is not that negotiation causes learning. Rather, negotiation is a facilitator of learning; it is one means but not

the only means of drawing attention to areas of needed change. Producing output and checking our own production is another way I suggest for learners, especially for those studying on their own. By listening to our own production, learners may be aware of the difference between our inter-language and standard target language with the aid of monitor function of our learned system. In this way, it can serve part of the similar function as interaction, setting the scene for potential learning to take place, while studying alone. It is also a way to address the limitation found in the study – lacking output.

5.2.3 As an Environment to Build Learning Community

As sociolinguists remind us, language is not just a private, in the head of the learner affair, but rather a socially constructed phenomenon (Kern & Warschauer, 2000). From the perspective of socio-cognitive, learning is not only just in terms of changes in individual's cognitive structure but also in terms of the social structure of learner' discourse and activity (Crook, 1996).

Therefore, language instruction is not enough to just provide comprehensible input. It is also necessary to help students enter into the authentic social discourse situation and discourse communities where English can be used authentically in a meaningful context.

In this study, I followed this perspective by selecting VOA special English, where students can learn language and cultural content at the same time, accessing authentic cultural background context and up-to-date news and issues which are vital in language learning. Here, I would like to further suggest the function of learning community.

Although the emerging technologies have provided much valuable educational potential for learners, learners may not readily recognize them. Here is an important question: How can we help learners develop their own ways of learning with existing devices? – They may not be aware of the potentials of the technologies.

Or there are other hindrances that prevent learners to make the most of the technologies. For example, we might have this experience. When learning a foreign language, for a long period of time, we could not perceive any improvement. Then, one day, like a magic change in our brain, we found ourselves different.

Acquisition appears to be gradual, takes time and often requires numerous doses of evidence. However, it is tough to patiently endure this hopeless period. We may suspect if we are on the right track to see the eventual good result. During this time, we need encouragement. This leads to another question: How can we help learners build confidence? – They may feel uncertainty and tend to give up halfway.

In this study, I also found other issues including how to inform learners' methods and appropriate use of the characteristics of the technologies, like the following question:

How can we encourage learners learning on their own? – They may feel lonely.

How can we help learners study in the correct way? – They may repeat the wrong process.

The learning community can be a solution to these questions. I visited the online Effortless English club, and found the support addressing almost all above questions. For example, when trying the method advocated in Effortless English, I could find the encouragement from the successful example in the learning community to help build patience and stick to it until the result was positive.

The mobile phone adds another means of communicating within the learning community, like downloading e-mails, and communicating by phone. Here we can see new technologies do not only serve the existing teaching/learning paradigms, they can also help shape new paradigms. Like all tools, they may mediate and transform human activity. Therefore, as educators we should always get ready to be open to potential affordances of emerging technologies.

In the last section, I discuss the limitations of the study.

5.3 Limitations of the Study

My own worldviews, beliefs, culture, educational background, personal experiences and social status inevitably influenced this research in conducting inquiry, interpreting data, and constructing the final writing.

The context of this study also had its unique features: participants were immigrants in Canada; they had the most effective motivation – integrative motivation (Gardner & Lambert, 1972); they could take the responsibility for their language learning devices and resources, and not be impeded by high-stakes English tests from pursuing truly meaningful learning; they could focus on English learning from which they could benefit in real life.

Due to the limitation of the resources in this study and my own knowledge, I invited Chinese adult learners as the research population. Being able to use the Chinese language was better for fully detailed description and the accurate capture of subtleties. However, choosing only Chinese participants might also limit the discovery because of

(1). the influence of our common native language – Chinese is the only language that uses symbols for words and has one syllable per character (Wikipedia, 2009)

(2). the similar English language educational background – in China, a structured method is adopted in most formal school English language education.

The understanding of the research problem might be limited within the population with these shared cultural characteristics. I suggest further study be conducted in a different population from a different culture, with different native language and different educational background.

# # #

Based on the findings and discussions in this research, the last chapter provided more general suggestions on adult ESL m-learning, including the way of designing mobile

English learning, suggestions on more powerful potentials of mobile technologies to enhance learning (i.e., used as a medium, a processor and an environment) and suggestions for further study design out of the consideration of the limitations of this study.

References

Aston, G. (1986). Trouble-shooting in interaction with learners: The more the merrier? *Applied Linguistics, 7,* 128-143.

Bardovi-Harlig, K. (1987). Markedness and salience in second-language acquisition. *Language Learning, 37,* 385-407.

Beagles-Roos, J., & Gat, I. (1983). Specific impact of radio and television on children's story comprehension. *Journal of Educational Psychology, 75,* 1.

Brown, R., & Hanlon, C. (1970). Derivational complexity and order of acquisition in child speech. In J. R. Hayes (Ed.), *Cognition and the development of language* (pp. 11-53). New York: Wiley.

Bruner, J. (1966). *Toward a theory of instruction.* Cambridge, MA: Harvard University Press.

Bonk, C. J., & Cunningham, D. J. (1998). Chapter 2: Searching for learner-centered, constructivist, and sociocultural components of collaborative educational learning tools. In C. J. Bonk, & K. S. King (Eds.), *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse* (pp. 25-50). Mahawh, NJ: Erlbaum.

Chinnery, G. M. (2006). Emerging technologies going to the MALL: Mobile assisted language learning. *Language learning & Technology, 10*(1), 9-16.

Chun, A., Day, R., Chenoweth, A., & Luppescu, S. (1982). Errors, interaction, and correction: A study of native-normative conversations. *TESOL Quarterly,* 16, 537-547.

Colpaert, J. (2004). From courseware to coursewear? *Computer Assisted Language Learning, 17*(3-4), 261-266.

Cook, V. (1996). *Second language learning and language teaching (2nd edition)*. London: Edward Arnold.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches (2nd edition)*. Thousand Oaks: Sage Publications.

Crook, C. (1996). *Computers and the Collaborative Experience of Learning*. Routledge.

Csikszentmilalyi, M. (1990). *Flow: The psychology of optimal experience.* New York: Harper & Row.

Day, R., Chenoweth, A., Chun, A., & Luppescu, S. (1984). Corrective feedback in native-nonnative discourse. *Language learning, 34*, 19-45.

Gardner, H. (1993). *Frames of mind: The theory of multiple intelligence (2nd edition).* London: Fontana.

Gardner, R. C., & Lambert, W. E. (1972). *Attitudes and motivation in second-language learning.* Rowley, Mass: Newbury House.

Gass, S. (1997). *Input, interaction, and the second language learner*. Mahwah, NJ: Lawrence Erlbaum Associates.

Gass, S., & Selinker, L. (1994). *Second language acquisition: An introductory course*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Gass, S., & Varonis, E. (1989). Incorporated repairs in NNS discourse. In M. Eisenstein (Ed.), *The dynamic interlanguage* (pp. 71-86). New York: Plenum.

Hinkelman, D. (2005). Blended learning: Issues driving an end to laboratory-based CALL. *JALT Hokkaido Journal, 9.* Retrieved October 18, 2009, from http://www.jalthokkaido.net/jh_journal/2005/Hinkelman.pdf

Hubbard, P. (1992). A methodological framework for CALL courseware development. In M. Pennington & V. Stevens (Eds). *Computers in Applied Linguistic* (pp. 39-66). Philadelphia: Multilingual Matters, Ltd.

Issidorides, D. (1988). The discovery of a miniature linguistic system: Function words and comprehension of an unfamiliar language. *Journal of Psycholinguistic Research, 17*, 317-339.

Kern, R., & Warschauer, M. (2000). Theory and practice of network-based language teaching. In M. Warschauer & R. Kern (Eds.), *Network-based language teaching: Concepts and practice.* New York: Cambridge University Press.

Klopfer, E., Squire, K., & Jenkins, H. (2002). Environmental detectives: PDAs as a window into a virtual simulated world. *Proceedings of IEEE international workshop on wireless and mobile technologies in education, 2002,* 95-98.

Kozma, B. (1991). Learning with media. *Review of Educational Research, 61*(2), 179-212.

Krashen, S. (1982). *Principles and practice in second language acquisition*. London: Pergamon.

Krashen, S. (1985). *The input hypothesis: Issues and implications.* New York: Longman.

Lenneberg, E. H. (1967). *Biological foundations of language.* New York: John Wiley and Sons.

Levy, B. J., McVeigh, N. D., Marful, A., & Anderson, M. C. (2007). Inhibiting your native language. *Psychological Science, 18*(1), 29-34. Retrieved March 18, 2009, from http://memorycontrol.uoregon.edu/lmma2007.pdf

Loschky, L., & Bley-Vroman, R. (1993). Grammar and task-based methodology. In G. Crookes & S. Gass (Eds.), *Tasks and language learning: Integrating theory and practice* (pp. 122-167). Clevedon: Multilingual Matters.

Mandl, H. & Levin, J. R. (1989). Knowledge Acquisition from Text and Pictures (Eds.). Elsevier Science.

McLaughlin, B. (1987). *Theories of second language learning*. London: Edward Arnold.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook (2nd edition).* Thousand Oaks, CA: Sage.

Milton, J. (2002). *Report 1: Literature review in languages, technology and learning.* Futurelab website. Retrieved August 10, 2009, from http://www.futurelab.org.uk/resources/documents/lit_reviews/Languages_Review.pdf

Naismith, L., Lonsdale, P., Vavoula, G., & Sharples, M. (2004). *Report 11: Literature review in mobile technologies and learning.* Futurelab website. Retrieved April 10, 2009, from http://www.futurelab.org.uk/resources/documents/lit_reviews/Mobile_Review.pdf

Parker, K., & Chaudron, C. (1987). The effects of linguistic simplifications and elaborative modifications on L2 comprehension. *University of Hawaii Working Papers in ESL, 6,* 107-133.

Pettijohn, T. F. (2009): *Psychology: A connecText (4th edition).* Retrieved November 18, 2009, from http://198.45.22.27/connectext/psy/

Pica, T., Doughty, C., & Young, R. (1986). Making input comprehensible: Do interactional modifications help? *ITL Review of Applied Linguistics, 72,* 1-25.

Prensky, M. (2005). What can you learn from a cell phone ? Almost anything! *Innovate 1 (5).* Retrieved February 17, 2010, from http://innovateonline.info/pdf/vol1_issue5/What_Can_You_Learn_from_a_Cell_Phone__Almost_Anything!.pdf

Rheingold, H. (2003). *Smart mobs: The next social revolution.* Cambridge, MA: Perseus.

Robinson, P. (1995). Review article: Attention, memory and the "noticing" hypothesis. *Language Learning, 45,* 283-331.

Salaberry, M. R. (2001). The use of technology for second language learning and teaching: A retrospective. *The Modern Language Journal, 85*(1), 39-56.

Schleppegrell, M. (1987). The older language learner. *The National Teaching & Learning Forum*. Retrieved March 17, 2009, from http://www.ntlf.com/html/lib/bib/87-9dig.htm

Schumann, J. (1976). Social distance as a factor in second language acquisition. *Language Learning, 26,* 391-408.

Sharwood, S. M. (1991). Speaking to many minds: On the relevance of different types of language information for the L2 learner. *Second Language Research*, 7, 118-132.

Stockwell, G. (2007). Vocabulary on the move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer Assisted Language Learning, 20*(4), 365-383.

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). Rowley, MA: Newbury House.

Swain, M., & Lapkin, S. (1995). Problems in output and the cognitive processes they generate: A step towards second language learning. *Applied Linguistics, 16,* 371-391.

Thomas, S. (2005). Pervasive, persuasive eLearning: Modeling the pervasive learning space. *Proceedings of the 3rd international conference on pervasive computing and communications workshops (PERCOMW'05)* (pp. 332-336). Kauai Island, Hawai'i: IEEE Computer Society.

Thornton, P., & Houser, C. (2004). Using mobile phones in education. *Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education (WMTE'04)* (pp. 3-10). JungLi, Taiwan: IEEE Computer Society.

Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning, 21,* 217-228.

Tomlin, R. S., & Villa, V. (1994). Attention in cognitive science and second language acquisition. *Studies in Second Language Acquisition, 16,* 183-203.

Trahey, M., & White, L. (1993). Positive evidence and preemption in the second language classroom. *Studies in Second Language Acquisition, 15,* 181-204.

Varonis, E., & Gass, S. (1985). Miscommunication in native/non-native conversation. *Language in Society, 14,* 327-343.

Wagner-Gough, J., & Hatch, E. (1975). The importance of input data in second language acquisition studies. *Language Learning, 25,* 297-307.

Walsh, T. M., & Diller, K. C. (1978). Neurolinguistic foundations to methods of teaching a second language. *International Review of Applied Linguistics in language teaching, 16,* 1-14.

Wikipedia: *Chinese language.* Retrieved May 10, 2009, from http://en.wikipedia.org/wiki/Chinese_language#Chinese_characters

Zhong, D. (2005). *The steps of listening exercises*. Ni Xiang Ying Yu Wang. Retrieved March 19, 2009, from http://www.nxenglish.com/jbczznnews.aspx?aid=3875

Zuengler, J. (1989). Performance variation in NS-NNS interactions: Ethnolinguistic difference, or discourse domain? In S. Gass, C. Madden, D. Preston, & L. Selinker. *Variation in second language acquisition: Discourse and pragmatics.* Clevedon, Avon, England: Multilingual Matters.

Appendix A: Mobile English Listening System

1. Voice of America (VOA) Special English

http://www.voanews.com/specialenglish/programs.cfm

A Special Christmas Story: The Gift of the Magi by O. Henry

http://www.voanews.com/specialenglish/archive/2008-12/2008-12-19-voa2.cfm

Alcohol, the 'Asian Flush' and the Risk of Cancer

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-12-voa2.cfm

Ann Morrow Lindbergh, 1906-2001: Pilot, Writer

http://www.voanews.com/specialenglish/2009-06-26-voa4.cfm

Baseball Terms: This Is a Whole New Ballgame

http://www.voanews.com/specialenglish/archive/2009-04/2009-04-11-voa2.cfm?CFID=151809536&CFTOKEN=38439921&jsessionid=843075bc5a7b98ed07491a3724403e3b4681

Buff: Are You a Buff About Something?

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-16-voa3.cfm?CFID=250569831&CFTOKEN=60530667&jsessionid=66302c90b3e39f3b0f9b1610b56e1c596273

Celebrating July Fourth at the Statue of Liberty

http://www.voanews.com/specialenglish/2009-06-27-voa1.cfm

Charlie Parker, 1920-1955: His Music Influenced Jazz during his Lifetime and Even Today

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-02-voa3.cfm

China Delays Plan for Web-Blocking Software on New Computers

http://www.voanews.com/specialenglish/2009-07-03-voa1.cfm

City of Pittsburgh Enjoys Its Days in the Sun

http://www.voanews.com/specialenglish/2009-07-12-voa2.cfm

Does US Need a Second Stimulus Plan?

http://www.voanews.com/specialenglish/2009-07-09-voa4.cfm

Easy As Falling Off a Log: Not Much Effort Involved!

http://www.voanews.com/specialenglish/archive/2009-06/2009-06-05-voa1.cfm?CFID=262981079&CFTOKEN=22659862&jsessionid=6630fb2c3ff3a86571b8376f07a393803460

'Hair' – More Than a Rock Musical

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-02-voa2.cfm?CFID=254136482&CFTOKEN=52477784&jsessionid=00301ef254e2e00a4f5a5b6d1c5d604f3023

Hands-Only CPR Is a Simpler Way to Save Lives

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-19-voa2.cfm

Happy Thoughts for Future = More Time to Live It?

http://www.voanews.com/specialenglish/archive/2009-04/2009-04-14-voa2.cfm

Industry Gathers for Paris Air Show at a Rough Time

http://www.voanews.com/specialenglish/2009-06-13-voa3.cfm

Khamenei Says Protests over Iran Vote Must End

http://www.voanews.com/specialenglish/2009-06-19-voa4.cfm

Michael Jackson, 1958-2009: He Amazed the World with His Music and Dancing

http://www.voanews.com/specialenglish/2009-07-04-voa3.cfm

Money, Influence and the Election of Judges

http://www.voanews.com/specialenglish/archive/2009-06/2009-06-11-voa9.cfm

Mothers through the Eyes, and the Years, of TV and Movie Makers

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-03-voa1.cfm

Obama Seeks Reforms in Financial Supervision

http://www.voanews.com/specialenglish/2009-06-18-voa2.cfm

Short Story: 'Luck' by Mark Twain

http://www.voanews.com/specialenglish/archive/2009-01/2009-01-02-voa2.cfm

Short Story: 'The Californian's Tale' by Mark Twain

http://www.voanews.com/specialenglish/2009-07-04-voa1.cfm

Short Story: 'The Ransom of Red Chief' by O. Henry

http://www.voanews.com/specialenglish/2009-06-12-voa1.cfm

Short Story: 'To Build A Fire' by Jack London

http://www.voanews.com/specialenglish/archive/2009-01/2009-01-10-voa1.cfm

Smoking and the Risk to Women's Lungs

http://www.voanews.com/specialenglish/archive/2009-06/2009-06-02-voa2.cfm

Water: Diving Into a Sea of Terms

http://www.voanews.com/specialenglish/archive/2009-05/2009-05-09-voa2.cfm?CFID=263027140&CFTOKEN=22757579&jsessionid=6630f0a5ca85f9ca868a46113d4e75203412

What Modern America Expects of Its Dads

http://www.voanews.com/specialenglish/2009-06-14-voa1.cfm

2. Effortless English

http://effortlessenglishclub.com/

Bad Choices

Double Standard

Greek Family

Longtime Affair

Lost Custody

Meddling Mother-In-Law

Nudist

Obsessive Behavior

3. Travel English

Wei, Z., Chen, L., & Gao, Q. (2008). *Oral English 15 Days.* Xi'an Jiaotong University Press.

At the airport

- At the information desk
- Checking the departure time
- Transfer to the next flight
- Check in at the counter

On the plane

- Changing seats
- Feeling cold/sick
- Meals on board

Arrive at the destination

- Immigration formalities
- Claiming the luggage
- Customs clearance

Traffic

- Leaving the airport
- Taking taxies and buses
- Taking the subway

At the hotel

- Room reservation
- Check in
- Hotel service
- Depositing valuables
- Complaints
- Suffering from theft
- Wake-up service
- Check out

Sightseeing

- Asking the way
- Car rental
- Questions asked about sightseeing

Accident

- Illness
- Lost

Dining

- Inquiring and reserving
- In a restaurant

Relaxation and Recreation

- Watching movies
- Leisure

Shopping

- In the department store
- Bargaining

Looking for special places

- Looking for a souvenir shop
- Looking for a washroom

In the post-office

- Sending a letter
- Sending a package

In the Bank

- Exchanging money

- Withdrawing money
- Changing money

Asking for direction

- Looking for a Chinese restaurant
- Looking for a youth hostel
- Being asked for directions

Returning home

- Going to the airport by taxi
- Checking in for the return flight

Appendix B: Interview Protocol

Project: Study of adult ESL M-learning

Time of interview: Date: Place:

Interviewer: Interviewee:

(Briefly describe the project. Assure the participant of confidentiality of responses)

Interviewing questions:

(1). Related to Activities:

- What learning activities do you think can be transferred to mobile language learning environment in order to get better learning gains?

- What activities do you think are not suitable to be done in mobile environment?

(2). Related to Experiences:

- How do you use mobile devices during dedicated learning time, leisure time, or on other occasions?

- What unique experiences of using mobile devices can enhance your language learning?

- What are you doing at present without the support of mobile devices?

(3). Related to Thoughts/Beliefs:

- What tools or learning materials do you want to have on hand any time, any where in terms of language learning?

- What functions would you like your mobile devices to have that further enhance your language learning? How will these possibilities help you?

- What concerns do you have which limit the use of mobile technologies in your present learning?

(Thank the participant for the interview)

UNIVERSITY OF CALGARY

CERTIFICATION OF INSTITUTIONAL ETHICS REVIEW

This is to certify that the Conjoint Faculties Research Ethics Board at the University of Calgary has examined the following research proposal and found the proposed research involving human subjects to be in accordance with University of Calgary Guidelines and the Tri-Council Policy Statement on *"Ethical Conduct in Research Using Human Subjects"*. This form and accompanying letter constitute the Certification of Institutional Ethics Review.

File no:	**6126**
Applicant(s):	**Rong Hu**
	Hanan Yaniv
Department:	**Graduate Division of Educational Research**
Project Title:	**Study of Adult ESL M-learning**
Sponsor (if applicable):	

Restrictions:

This Certification is subject to the following conditions:

1. Approval is granted only for the project and purposes described in the application.
2. Any modifications to the authorized protocol must be submitted to the Chair, Conjoint Faculties Research Ethics Board for approval.
3. A progress report must be submitted 12 months from the date of this Certification, and should provide the expected completion date for the project.
4. Written notification must be sent to the Board when the project is complete or terminated.

Kathleen Oberle

Kathleen Oberle, Ph.D
Chair
Conjoint Faculties Research Ethics Board

JUL 0 6 2009

Date:

Distribution: (1) Applicant, (2) Supervisor (if applicable), (3) Chair, Department/Faculty Research Ethics Committee, (4) Sponsor, (5) Conjoint Faculties Research Ethics Board (6) Research Services.