U.S. INTERNATIONAL ESL STUDENTS' EXPERIENCES WITH AND PERCEPTIONS OF UTILIZING MOBILE TECHNOLOGIES FOR ENGLISH LEARNING

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Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

December 2017

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Zhu, Shanyuan. *U.S. International ESL Students' Experiences with and Perceptions of Utilizing Mobile Technologies for English Learning*. Doctor of Philosophy (Learning Technologies), December 2017, 122 pp., 16 tables, 4 figures, references, 210 titles.

The purpose of this research was to examine ESL (English as a second language) students' current use of their mobile phones for English skill building activities outside of class in a U.S. school setting. In addition, this research reported on students' perceptions of the potential benefits of using smartphones in class for English learning. Also learners' current English related activities using mobile devices and time duration of using different phone features were studied. The literature review included smartphones, computer education, mobile learning, mobile assisted language learning (MALL), computer assisted language learning (CALL), theories of second language learning, second language learner attributes and the use of smartphones outside the classroom. An electronic survey was used to collect the quantitative data which were analyzed by descriptive and inferential statistics. The results concluded that students used mobile applications on a daily basis to read and write email, read books and news, check a dictionary, talk, text and video chat. Students used mobile phones outside of class to improve the English skills listed in the survey and the same participants perceived the potential benefits of using smartphones in class for the same English skills. Among the English skills, vocabulary exercises, finding example sentences of English words and English grammar exercises had a significant difference between out of class and in class variable. The results indicated a direction for future research on using mobile phones for ESL learning. This study also revealed a focus of practice for utilizing mobile technologies in the teaching and learning of ESL.

ACKNOWLEDGEMENTS

I would like to thank many people for supporting me through the process of pursuing and completing the dissertation research in the Ph.D. program. First of all, I would like to thank my major professor Dr. Cathleen Norris for her tremendous help and endless encouragement. I would not have come this far without her patient conversation and guidance for me in this life journey. I would also like to thank my committee members Dr. Michael Spector and Dr. Lin Lin. I appreciate their classes, teaching, and genuine academic advice on my dissertation.

Secondly I would like to thank Dr. Mandlakayise Patrick Mthethwa for his approval of using his validated instrument to collect the research data. At the same time, I appreciate the efforts of English Language Institute Directors Dr. Fernando Fleurquin and his assistant Mrs. Carol Ogden for their assistance with the dissertation research study.

Lastly, I would like to give special thanks to my loving husband who has always been by my side during the preparation of the dissertation. I wouldn't have completed this work without his support and confidence in me. Mostly, I am grateful to Almighty God who enabled me with strength and blessed me with loving parents, supportive family and friends. This dissertation is also dedicated to my father-in-law and mother who both passed away.

Finally, I appreciate the wonderful personnel in the Department of Learning Technologies, who supported me with fellowship and scholarship during my pursuit of the Ph.D. and without whom I wouldn't have successfully made it through. Thank you all!

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CHAPTER 1

INTRODUCTION

This study examined ways to help international students and English language institutes integrate mobile phone technologies for the study of English as a Second Language (ESL). To narrow down the topic and specify the problem that this study examined, the current state of mobile phone technology with a brief history of the development of computing technologies, the influence of technologies on ESL learning, the difficulties of ESL learners in an English speaking country are discussed in this chapter. By the end of Chapter 1, a specific problem was defined and the purpose and significance of the study described.

Personal computing itself has roughly 40 years of history since 1974, when the Altair 8800, an early personal computer that could be assembled by people at home was invented (Provenzo, Brett, & McCluskey, 1999). Later, the microcomputer was designed for use by the average person rather than specialists. Provenzo (1986) compared how microcomputers have changed the way people do business and the mental process of planning their work. Along with the development of computers, the Internet, the World Wide Web, and computer languages such as HTML, email, and text messaging have also changed the way we communicate (Ceruzzi, 2003).

The Internet and World Wide Web have further revolutionized how globalized communication can occur. Work has been transformed from the traditional industrial way, and the economy has become an information-based, service economy (Sweeny, 2010). In his book, *The World is Flat*, Friedman (2005) indicated that this globalization of access to communication networks means work that work used to be done only during normal working and daylight hours is now done anytime and anywhere.

With the rapid development of technology, the world became smaller, allowing people to

do business and communicate together in ways not previously possible (Friedman, 2005; Sweeny, 2010). English is used by people from many countries around the world as the official language of science, technology and education (Crystal, 2003; Graddol, 1997, 2006; Liu, Moore, Graham, & Lee, 2002). Many schools expect students to learn English even at a young age (McKay, 2003). To know ESL and have English speaking skills have become very important in the global job market (Charkova & Charkova, 2013). Many college students, young adults or high school students join a study abroad program to have an opportunity to study in another country, especially in Western and European countries where their citizens' first or professional language is English. One of the requirements for these students to be accepted is to pass English language programs and be prepared for academic classes in English (EF EPI English Proficiency Index, 2011; Majeed, 2013). Universities often have an English language institute to help international students with their language barriers (Almasri, 2013).

However, there are still many challenges for international students to adapt to a new environment with a new school setting in another country (Liu, 2007). International students usually experience many problems including language barriers to become familiar with the new culture and to achieve their educational goals (Olivas & Li, 2006). While English teachers can teach and help with course content in class, students could still struggle outside of class when communicating with native speakers in a new foreign environment (Almasri, 2013; Fujimoto, 2012; Olivas & Li, 2006).

Fortunately, with the development of information communications technology (ICT), students may use electronic devices to look for the meanings of words from electronic dictionaries on their smartphones (Mthethwa, 2014). Learning applications can be downloaded to

help ESL students with vocabulary, phrases and pronunciation (Almasri, 2013; Chinnery, 2006; Kennedy & Levy, 2008; Thornton & Houser, 2005).

Among the ICTs, mobile technologies have quickly become one of the most widely used computing technologies: as of January 2014, 90% of American adults owned a cell phone, and as of October 2014, 64% of those adults had a smartphone (Pew Research Center, 2014). The number of smartphone users worldwide surpassed 2 billion in 2016, while in 2015, only one-quarter of the global population used smartphones (eMarketer, 2014). The Pew research center survey also showed that the highest smartphone ownership was among young adults: 85% of users were between 18 and 29 years old and 79% between 30 and 49 years old (Pew Research Center, 2015). The use of mobile devices by university students has increased dramatically in recent years and has become their primary source of Internet access on campus (Keller, 2011). A study conducted by Chen and Denoyelles (2013) at the University of Central Florida found that of 1,082 students surveyed, 79% owned a smartphone. A comprehensive study of 100,000 students from 195 college campuses conducted by Dahlstrom (2012) found that most students still owned laptop computers (86%), but 62% of these same students reported owning smartphones while 15% reported owning tablets. More importantly, 67% of those students who reported owning smartphones or tablets indicated they used them for academic purposes (Almahfud, 2014).

Statement of the Problem

Smartphone technologies are widely used by students and teachers. Smartphone technologies also are used to assist international students with communicating and learning English quickly and effectively (Almasri, 2013). However, not many research articles reported

how the use of smartphone technologies out of class influenced students to learn English as a second language (Mohammad, Omer Hassan, Pandian, Yazan, Ahmed, Albdour, & Bazar, 2014). The ownership of smartphones does not mean that students are willing to use the technologies for the purpose of English language learning (Barrs, 2011). On the other hand, researchers have learned that effective teaching methods with mobile devices have shifted from teacher-centered to student-centered approaches (Mohammad et al., 2014; Nah, White, & Sussex, 2008) because of the pervasive use of smartphone technologies. Therefore, to effectively integrate smartphone technologies into ESL classrooms using a student-centered instructional design method, the first step was to investigate the students' perspectives of using this technology for English language learning (Barrs, 2011). These perspectives included students' behaviors, attitudes, beliefs, perceptions and preferences about their current smart technology devices. To find out what type of devices and smartphone features ESL students are currently using would better assist curriculum coordinators and instructors in the design of smartphone-integrated, student-centered teaching methods customized with students' preferences. Knowing this information would also help researchers understand how smartphone technologies, in an off-campus setting might have already started influencing ESL students' attitudes, motivation, beliefs, and purposes in learning ESL. To specify the problems and find out answers, four research questions were investigated:

1. In which specific mobile phone activities did students engage in English and for how much time each day?
2. In which skill building activities did ESL students engage on smartphones for English learning out of class?
3. What benefits did the ESL students perceive they might gain by using smartphones to learn English in the classroom?
4. To what extent were students' perceptions of using mobile phones for each English skill item in class different from students' actual behaviors on mobile phones for each English skill building out of class?

Purpose of the Study

The purpose of the current study was to examine students' current use of their mobile phone for activities in English and their use of skill building activities on their mobile phone to learn English as a second language outside of class. In addition, this research reported on students' perceptions as to the benefit of using mobile phones to learn ESL in class in a U.S. university setting located in a large southwestern metropolitan area. In recent years, many published research studies have been undertaken relating to mobile assisted language learning (MALL). Quite a few articles reported studies of using smartphone technologies in the second language learning classroom (Alemi, Sarab & Lari, 2012; Brown, 2009; Derakhshan & Kaivanpanah, 2011; Godwin-Jones, 2008; Kukulska-Hulme & Shield, 2007; Nah et al., 2008;). These studies reported positive results of the language learning experiences with the integration of mobile phone applications such as text messages, photos, dictionaries, etc. The positive results included a longer retention time of vocabulary in the user's long-term memory as well as improved learning performance and motivation (Chang, Yan & Tseng, 2012). However, recent emphasis on language learning as an overall process has brought attention to the fact that learners are not just cognitive beings who simply consume knowledge passively (Ganjabi, 2010). Learners have a combination of different factors in their inner-self and surroundings that help them learn in the best possible way (Breen, 2001b). Many of the current research studies focus mainly on the technology and knowledge part of the process (Mandinach & Cline, 1997), but not on the students themselves to include their current behaviors and perspectives using smartphone technologies (Chen, Hsieh, & Kinshuk, 2008; Chinnery, 2006; Godwin-Jones, 2011; Kukulska-Hulme & Shield, 2007; Yang, 2013). Since the ownership of smartphone technologies among college students in most countries is high, it is worthwhile to learn if smartphones were an

indispensable tool for this group of ESL learners, how the ESL learners used smartphones for English learning out of class and what their perceptions were towards using them for English learning in class. Thus, educators and administrators would benefit by understanding students' habits of using smartphones, students' perceptions, attitudes, purposes, etc. on their mobile device(s). Educators could then come up with more functional, technology integrated teaching methods that cater to digital students who are defined as "young adults who have grown up with active participation in technology as an everyday feature of their lives" (Andone, Dron, Boyne, & Pemberton, 2006, p. 2).

Significance of the Study

The increasing ownership of smartphone technology around the world and the accessibility of Internet information through high-speed broadband access suggest that a new way of learning with mobile technologies has emerged (Almasri, 2013; Godwin-Jones, 2008; Huang, Hwang, & Chang, 2010). Outcomes from research studies investigating the use of mobile phones in academic settings showed positive results; some mobile phone integrated teaching methods significantly improved students' learning performance and motivation to learn (Basoglu & Akdemir, 2010; Yang, 2012), especially in ESL which is the subject matter of this study. Although most research focused on technology features (text messages, email, podcasts, etc.) and applications (Godwin-Jones, 2008), there is no well-designed pedagogy to show which technology integrated teaching method is better than another and in which aspect and for which students. While teachers can be experts of a course subject, they are not necessarily technology experts. However, equipped with technology skills, teachers can become more competitive in the job market (Mthethwa, 2014).

Since mobile technologies have become so popular in societies, students may already have invented ways to use their phones to learn what they want to know (Prensky, 2005). Research on mobile learning has revealed that students' roles have shifted from passive receivers to more active and engaged participants in learning situations (Wong & Looi, 2010). For example, during the learning process, students used mobile devices to take photos and construct sentences with vocabularies in a more active way since they were engaged in the activities. The study by Wong and Looi (2010) emphasized learner-created content so learners could be actively involved in the design and construct meaning through the learning process. Other research articles also mentioned technology has contributed to the pedagogical shift from a teacher-centered approach to a learner-centered approach (Facer, Joiner, Stanton, Reid, Hall & Kirk, 2004; Richards, 1985). English language teaching has undergone significant changes. However, at the micro level, far too little focus has been given to second language learning using smartphone technologies outside classroom settings (Mohammad et al, 2014).

In light of these facts, this study helps to understand ESL students' experiences using mobile/smartphone technologies to learn English outside of the classroom, as well as to look into students' perceptions and attitudes about adopting mobile/smartphone technologies in class to improve their English language skills, such as communication and writing skills. The results would help ESL educators understand the mobile technology phenomena related to ESL learning, thus, the result of this study would also further help curriculum coordinators and course designers to design better mobile technology integrated teaching methods.

CHAPTER 2

LITERATURE REVIEW

Introduction

To further analyze the research topic and research questions of this study, and to understand the current background of mobile learning and provide feasible solutions, this chapter introduces research literature about smartphones, computer education, computing technologies in Education, mobile learning, CALL (computer assisted language learning) and MALL (mobile assisted language learning), theories of second language learning, second language learner attributes and the use of smartphones outside the classroom.

Smartphones

The first handheld mobile phone was invented in 1973 by Motorola Company and was the first wireless communication product small enough to use anywhere. With a short history of 44 years, compared to other computing technologies, mobile phones have quickly developed into an advanced emerging computing technology. As stated in Kaku's (2012) book, *Physics of the Future*, "Today, your cell phone has more power than all of NASA back in 1969, when it placed two astronauts on the moon" (p. 23).

Because mobile technologies derived from computer technologies they are also considered computing technologies (Poslad, 2009). Computing technologies have gone through a history of roughly 200 years since the first mechanical computer was created by Charles Babbage in 1822. Babbage's computer was able to perform all four arithmetic operations - addition, subtraction, multiplication and division (Bromley, 1987). A wide variety of computing devices exist in the market today, including: desktops, laptops, tablets and smartphones. During the past 200 years, scientists and computer specialists have been developing technology tools and various electronic devices that have increasingly more powerful functions, longer battery life and use higher-speed bandwidth (Godwin-Jones, 2008). Today the ARM Mali-T628MP6 GPU inside

the Exynos-based Samsung Galaxy S5™ outputs 142 G floating-point operations (FLOPS) per second and stands stronger than the 259th most powerful computer in the world, Deep Blue in 1997 (Nick, 2014). Two of the newest smartphones were introduced in 2016, the iPhone 7 Plus™ and the Samsung Galaxy 8™. These two smartphones have multiple functions and a complexity that is similar to a personal computer. Phone prices and phone plans get cheaper and more affordable to consumers according to technology market-research firm International Data Corp (Pew Research Center, 2013).

Computer Education

There are roughly three specific stages that the history of computing has progressed through in the past 30 years: hardware and software levels, the information age and the institutional context of computing. These three distinct traditional topics of computing are still the interests among many people (Misa, 2007). As computing technologies continue to develop, so has education using these technologies. There are two terms related to technology and education that are especially relevant to this study; one is technology education and the other is educational technology. To clarify the difference, William E. Dugger, Jr., and Nitin Naik cited two definitions: Technology education, also called technological studies, is "a study of technology which provides an opportunity for students to learn about the processes and knowledge related to technology that are needed to solve problems and extend human potential" (International Technology Education Association, [ITEA], 2000, p. 242). Educational technology, also related to instructional technology or informational technology, is more concerned with instructional design and technology integration in education. Educational technology is more involved with information and communication technology and with the

practice of using technology to improve the teaching and learning process (Dugger & Naik, 2001).

These two terms and concepts: Technology education and educational technology can trace back to Taylor's (1980a) book, *The Computer in the School: Tutor, Tool, Tutee.* One of the most cited statements from his book is "For the foreseeable future, computing will play an increasingly important role in human learning. However, no one yet knows exactly how great that role will eventually be, or precisely what form it will finally take" (Taylor, 1980b, p. 1).

Computing technologies have been continuously developing. People have adopted them at work, at school, at home, and elsewhere. Laptops, tablets, and smartphones are more convenient than computers. University students have many devices now to choose from and decide what to use, how to use it, where to use it, and when to use it, according to their personal needs and schedules (Crompton, 2013). Learners now have more control over their education through their interactions with technologies that provide resources and information (Scanlon, Jones & Waycott, 2005). Ubiquitous learning allows students to learn both in a formal and non-formal setting (Cope & Kalantzis, 2009). Using mobile technology devices may provide convenience for people to participate in the information age.

There is a relationship between information communication technology and higher education. "There is no doubt that, over the last 15 years, there has been a phenomenal growth in ICT in all aspects of society, and education is not an exception" (Unwin, 2007. p. 296). Putting technology in the classroom could help students improve their communication, interaction, creativity and problem-solving skills. (Becta, 2004; Lindquist, Denning, Kelly, Malani, Grisworld & Simon, 2007; Liu, Wang, Liang, Chan, Ko & Yang, 2003; Zurita & Nussbaum, 2004). Technology was also credited with enhancing students' overall achievement and

engagement in language learning (Cobb, Heaney, Corcoran & Henderson-Begg, 2010; Markett, Sanchez, Weber & Tangney, 2006).

The digital experience with these new technologies has caused a paradigm shift with today's students and has persistently influenced students' language learning preferences (Harnad, 1991; Warschauer, 2003). For example, students prefer to use an electronic dictionary rather than hard copy dictionary to look up the meaning of new vocabulary (Warschauer, 2003). There is a new literacy for students to master besides their subject content with the traditional way of learning from books. 21st century literacy includes not only traditional print such as paper and pen, but also new literacies such as computer, media and Information literacies (Coiro, Knobel, Lankshear & Leu, 2008). As noted by Leu, Kinzer, Cairo & Cammack (2000), new literacies "include skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies" (p. 1572). "Information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues and problems at hand" (Thompson, 2003, p. 2).

Different departments at schools started applying computer technologies in different subjects (Becker, 2001; Eteokleous, 2007). In language learning, CALL (computer assisted language learning) and MALL (mobile assisted language learning) are both referenced. MALL study has become more popular than CALL (Khazaie & Ketabi, 2011; Saran, Seferoslu, & Cagiltay, 2009). Burston (2013) compiled an annotated bibliography of implementation studies and found about 350 to 575 research articles relating to MALL that have been published over the past two decades. Burston (2013) pointed out that "the advent of hand-held computer-based devices gave rise to MALL as we know it today" (p. 1).

Burston's bibliography provided a comprehensive historical background of MALL and an adequate perspective of MALL implementations from the first published work in 1994 to the end of 2012. The bibliography provided a wide selection of literature references related to the current study. Most of these articles were project-based experiments using a type of mobile technology that helped improve performance and led to positive attitudes (Burston, 2013). The technology features mentioned include SMS (short message service), photos, audio and video, multimedia, dictionaries, Global Position System GPS navigation, MP3s, recorders, emails, vodcasts, podcasts, e-readers, PowerPoint™ multimedia, context sensitive, class forums and customized designed applications. Results were found indicating that mobile technologies can improve the retention of new vocabulary (Alemi et al., 2012; Coxhead, 2000; Joseph & Uther, 2009; Lu, 2008; Warschauer & Meskill, 2000) and facilitate advances in communication to include listening, speaking skills, and testing (Demouy & Kukulska-Hulme, 2010; Godwin-Jones, 2008; Kukulska-Hulme & Shield, 2007; Nah et al., 2008).

Mobile phone, specifically smartphone technology for ESL is the main focus of this research. Henceforth, this literature research starts from a large scope with computing technologies in education to more focused search terms such as mobile learning, mobile language learning, CALL and MALL. There was a trace found from a synthesis of MALL related articles that effective language learning using mobile technologies should shift the focus from technology applications to learner-centered instructions, since learners are multidimensional beings who have different attributes contributed to learning a second language successfully (Mohammad et al., 2014; Nah et al., 2008). Hence, besides MALL research, this review included articles about ESL learners' attributes within a mobile technology enriched environment, such as users' behaviors on mobile phones, students' beliefs, preferences, learning

styles, purposes and perspectives of MALL. These attributes were studied and analyzed. In this case, learners were international students who study at an English language learning institute at a large southwestern university. Literature about second language learners using mobile technologies was also the second large area reviewed besides MALL. The current research study might imply how to improve students' attitudes and motivation by using a teaching method integrating mobile phone technologies with learners' own learning styles and preferences.

Computing Technology/Technologies in Education

During the 1960s, computer-assisted instruction (CAI) existed using a behaviorist model and language instruction and was in the form of drill and practice (Butler-Pascoe & Wiburg, 2003; Stevens, 1989). Throughout the 1980s and 1990s, such English teaching instruction method transitioned to content-based because the cognitive and language proficiency needs of ESL students was a primary concern (Butler-Pascoe & Wiburg, 2003; Nunan, 1999; Snow & Brinton, 1988). Today more focus is on constructing meaning with computers by students. This method has roots in the work of Vygotsky and Piaget. With the development of new technologies, CAI continues to change to promote language acquisition (Lacina, 2005).

Vygotsky's communicative theory was supported by using computers in learning (McLoughlin & Oliver, 1998). Vygotsky (1978) stressed the fundamental role of social interaction in learning from a social cultural approach to cognition development. McLoughlin and Oliver (1998) provided evidence that computers are social facilitation to support collaboration, group work and interaction through cognitive development. Teachers could create authentic learning environments and interesting activities for students if computers were used appropriately (Healey & Klinghammer, 2002). Students can construct knowledge through the

scaffolding of their learning process. With multiple options through various technologies, it is important that the technology chosen for learning increases students' interactivity (Lacina, 2005). Web-based instruction such as Internet chat sessions, discussion boards and web quest can meet this need.

Students can use Internet chat sessions to communicate with peers, which is a virtual place on the Internet that allows students to be open, and the conversations may be easier to understand than spoken English. Students are engaged with an Internet chat session since the platform is easy to use after reading the conversation more than one time (Freiernuth, 2002). Discussion boards could help with students' collaboration and experiential learning experiences. For example, discussion boards were able to help students with constructive language learning tasks (Bikowski & Kessler, 2002). WebQuests are authentic Web-based environments that support inquiry learning, and are highly structured and group oriented. The WebQuest model has been used for many education courses and staff trainings (Dodge, 2001). A WebQuest can be a long-term project, or it can last one to two class periods. WebQuests were beneficial to English language learners because the platforms provided a cooperative learning environment in which communication and problem solving were emphasized (Lacina, 2005).

Similarly, Ghasemi, Hashemi and Haghighi Bardine (2011) believed that learning via technology and computers had many benefits. The Internet can provide up-to-date data and vast amounts of information. Computers can be used as tools for reading, writing, and for student interactions and teaching (Talebi & Teimoury, 2013). Most importantly, students become more active learners with the integration of computer-based content. There are computer programs that provide game activities such as Rosetta Stone® language library and Lyric language. Other

language software includes Tell Me More®, Mango languages®, and Powerspeak® (Stuhr, 2012).

Rosetta Stone® used the dynamic immersion approach (Marcy, 2007) which means to include advanced interactive technology such as images, intuition, interactivity, instruction and immersion to create a rich visual environment. This was similar to the immersion process when people learn their native language (Miller, 2014). Powerspeak®, on the other hand, provides techniques to include video, the written word, games, flashcards and opportunities to listen, record, and play back responses to keep lessons interesting and interactive. Powerspeak® teaches using contexts with clear instructions and immediate feedback for each exercise. Vocabulary is built into the context of a story told in English (Miller, 2014).

Mobile Technology/Mobile Learning

Because of the mobility and ubiquity of the smartphone technologies, e-learning has brought about revolutionary change (Peng, Su, Chou, & Tsai, 2009). Mobile devices are becoming more powerful with large storage and better bandwidth. The new devices are thinner in size, but with larger screens. Mobile phones are portable and convenient for users to use anytime, anywhere in their daily life, therefore the applications for mobile devices have been widely utilized in daily life, including at schools and workplaces (Huang et al., 2010). Because of their portability and cellular capability, mobile devices such as PDAs (personal digital assistants) and smartphones could be instant communication tools (Lea & Callaghan, 2011; Tung, Chang & Chou, 2008). Together with the evolving mobile technologies, advanced mobile applications, which are individual programs installed on mobile devices, have also been developed. "Besides the increase of usage, mobile device technology has been drastically

developed and transformed in an integrated way" (Yang, 2013, p. 2). Mobile phones are popular because they are convenient, easy to use and small so people can carry them around easily. Mobile phones are used for many different purposes such as communication, information services, entertainment, and education (Suki, 2007). The innovative design of many mobile learning applications facilitates users studying educational material conveniently as well as interacting with others anytime and anywhere collaboratively. (Huang et al., 2010). The educational potential for mobile computing was emphasized in the 2012 and 2013 Horizon Reports. For example, social network mobile applications with the Samsung Galaxy™ tablet worked well for both creating and sharing documents (Johnson, Adams & Cummins, 2012; Johnson, Adams, Cummins, Estrada, Freeman & Ludgate, 2013).

In addition to the traditional way of communicating orally through mobile phones, the current mobile technologies enable users to access the Internet for locating information, emailing, reading e-books, and shopping etc., anywhere at any time. The use of mobile devices has enabled seamless access to the Internet across both formal and non-formal learning contexts (Scanlon et al., 2005). Learning is not dependent on a particular location such as a classroom. Mobility has enabled learning at a place or at a time that is convenient to learners (Yang, 2013). Mobile technologies, specifically mobile phones and smartphones are the most popular among all technological devices in the 21st century and mobile technologies have an important place particularly in young people's lives (Saran et al., 2009). Mobile phones outnumber personal computers at a rate of 5 to 10 times the total number worldwide except for in Canada (Prensky, 2005).

The idea of using mobile technologies to learn has assumed an increasing emphasis in the field of learning English as a foreign language (Burston, 2013; Khazaie & Ketabi, 2011; Saran et

al., 2009). The increasing ownership of mobile phones, especially among the young generation calls for a need to look for constructive uses of this technology (Motiwalla, 2007). O'Conner (2005) mentioned that helping students use their mobile phones constructively was better than fighting with them over playing with their phones in class. In order to enhance learning in a Saudi Arabian university English as a foreign language class, Morris (2011) explored ways to incorporate technology, especially laptop computers and mobile phones into the classroom. Reinders (2010), also introduced some specific practical uses of mobile phones for English learning classes, such as keeping notes of daily conversations, using the camera to take pictures, recording conversations, using the phone's voice recorder outside the classroom, and texting others to improve vocabulary learning and writing. These activities using the mobile phone features could possibly help with the issue of lack of motivation, which may be caused by applying out-of-date teaching methods in traditional classrooms since students have grown up with digital devices (Andone et al., 2006).

However, people have not been able to use their mobile devices to read and write on the Web until recently within the last 5 to 10 years. Today's advanced models of mobile devices have features such as media players with voice and video recorders, high-resolution cameras with touchscreens, global position system (GPS) navigation, Wi-Fi and mobile network broadband access, and Web browsers to access and properly display standard Web pages similar to how they appear on a regular computer. The smartphone is capable of information transfer to include texts and email. These applications can attach documents, pictures, and audio or video files for media communication (Huang et al., 2010).

CALL and MALL

With the rapid development of mobile computing technologies and handheld devices, it is common to believe 21st century students are technology savvy because of the pervasive use of technology tools such as computers, laptops, smartphones, and tablets has become indispensable in students' lives (Huang et al., 2010; Yang, 2013). The use of technology tools for learning different school subjects is not uncommon and current students normally interact with technological tools in ways that define their social and educational dispositions (Mthethwa, 2014). “There is a documented research path reflecting the adoption of mobile technology to support language learning, this research path is predominantly in areas like computer assisted language learning (CALL)” (Mthethwa, 2014. p. 1).

The utilization of computer technologies has been continuously normalized toward the future stage (Yang, 2013). Warschauer (1999) claimed that the use of computers should be included as a primary component of language learning and language use and not as a special case. Egbert (2005) defined "Computer assisted language learning (CALL) as learners learning language in any context with, through, and around computer technologies" (p. 4). The definition was changed to "any context" and "computer technologies" to generalize not only desktop computers and laptops but also electronic mobile devices (smartphones and tablets). The change to easy access of information from smartphones or tablets for language learning anytime, anywhere, would start making the learning boundaries between classroom and home disappear (Yang, 2013). The same idea appeared in the Horizon Report 2012 and Horizon Report 2013 which highlighted the educational potentials of mobile and tablet computing (Johnson et al., 2012; Johnson et al., 2013). Mobile assisted language learning, is a quickly growing subdivision of CALL (Yang, 2013).

The traditional language classroom has been transformed persistently by CALL and MALL and the 21st century teachers will continue to face the challenge and reality of this transformation. This transformation led to a great deal of classroom expansion engendered by technology (Berger, 2004; Jensen, 2002; Keegan, 2002), the expansion needed to be aligned with teaching strategies and current educational situations (Mthethwa, 2014).

Today, technology in the language classrooms has been noted for improving reading, speaking, writing, listening, creative, problem-solving and other interaction skills (Becta, 2004; Lindquist et al., 2007; Liu et al., 2003; Zurita & Nussbaum, 2004). Therefore, technology is fundamental for enhancing students' achievement, engagement, and overall participation in language learning (Cobb et al., 2010; Markett, et al., 2006). Furthermore, technology provides students access to different resources and tools to assist personal learning (Mthethwa, 2014).

Sharples (2000) saw mobile learning as the new method of learning. Kiernan and Aizawa (2004) evaluated the use of mobile phones as tools for university students English learning and suggested that mobile phones were worthy of further investigation as a language learning tool. Because of their portability, media use such as camera, audio and video recording, and cost efficiency as compared to that of a laptop or desktop PC, mobile or handheld devices could be very beneficial for supporting mobile assisted language learning (Wishart, 2009). Since language learners could easily carry and access their mobile devices anytime, anywhere, this convenience help them to communicate with teachers and peers with fewer time and space constraints (Chinnery, 2006; Nah et al., 2008; Rosell-Aguilar, 2007).

Since the learning could take place in a variety of places and situations, a new method of mobile learning needs to be supported by different modalities and the possibility for learners to choose the learning resources that are easily accessible. At the beginning, most research about

mobile-based language learning only focused on vocabulary learning by providing instant help in either obtaining the meaning of a word (Morita, 2003) or help in pronouncing a word. However, mobile technology seems to provide a personalized learning environment and caters to each individual learning style (Demski, 2012).

Mobile phones have increasingly been incorporated into language teaching and learning. Applications had ranged from vocabulary learning to idioms and grammar (Thornton & Houser, 2005) and to cultural understanding, listening and speaking. Mobile learning can take place in both formal and non-formal settings. Learning can take place wherever is convenient. Levy and Kennedy (2005) looked at how to use SMS text messages on students' mobile phones to extend the formal lessons from inside the classroom to vocabulary practice outside the classroom and to also encourage students to practice throughout the week. Fallahkhair, Pemberton, and Griffiths (2007) developed language learning services by using mobile phones together with interactive television to improve learning that can happen at home in the living room. Kennedy and Levy (2008) suggested that students take advantage of short periods of time available during the day such as while riding on the bus or waiting for a class or appointment, by sending messages using the second language that they are learning. Ally and Tin (2009) used mobile phones to help immigrant learners practice their English pronunciation and to prepare them for speaking at work; in recent years, podcasts have also proved to be a popular way of reaching wide audiences such as ChinesePod for learning Mandarin Chinese (Horkoff & Kayes, n.d.).

Several popular English learning applications for ESL students included Rosetta Stone®, FluentU, Memrise, Duolingo, Open Language, Busuu. These applications made short lessons and integrate multimedia components into the lessons to make them fun and interesting to English learners. For example, Memrise© and Zuknow© provided better methods for vocabulary

learning because students use social sharing of flashcards and spaced repetition (Wolfe, 2015). FluentU is a software to access original resource videos such as TV shows, commercials and music for language and culture learning (Gomez, 2016).

Graff (2006) did a research study about using Rosetta Stone® to improve ESL students' English language pronunciation. The study showed a moderate correlation between the time using the software and pronunciation improvement even though the result appeared to be no significance difference using Rosetta Stone® for pronunciation performance. Banafa's (2004) study on Rosetta Stone® also found the software positively affect participants' pronunciation. Rosetta Stone® was also interactive (Banafa, 2004; Sanchez, 2013). Some other applications such as Dictionary, English Grammar and Hangman were used to focus on certain basic English skills such as building vocabulary and understanding grammar.

Theories of Second Language Learning

Studies have employed mobile technologies to deliver content necessary for enhancing language learning. In language class, there are four aspects: listening comprehension, reading comprehension, speaking and writing. To begin learning a second language, teaching starts with simple vocabulary and phrases, followed by grammar, syntax, and clauses, and then moves to more complicated sentence structures in various contexts. Previous research on mobile assisted English learning (Chen & Chung, 2008; Thornton & Houser, 2005) tended to examine only knowledge acquisition or learning performance through the use of mobile phones. Researchers studied use of smartphone technologies to improve students' vocabulary (Joseph & Uther, 2009), pronunciation and to shift students into more interactive activities using the second language. Some researchers also paid more attention to one of the four language skills such as writing

ability (Morita, 2003), and English listening skills (Edirisingha, Rizzi, Nie & Rothwell, 2007). These included supporting vocabulary learning (Lu, 2008), advancing reading comprehension ability (Chen & Hsu, 2008), enhancing writing ability (Morita, 2003), improving English listening (Nah et al., 2008), and practicing pronunciation (Godwin-Jones, 2008).

Mobile language learning focused on “practicing specific elements of knowledge and skills instead of using language merely as a means of communication” (Tai, 2012, p. 220). Other research into MALL studies explored mobile technology features which include "personal, situated, authentic, spontaneous, informal, and continuous access, as well as direct interaction across diverse contexts" (Kukulska-Hume, 2009, p. 162).

The most important aspect of language learning is communication. The technical aspect of communicative mobile technology was able to support communication pedagogy in recent years (Tai, 2012). As more communicative applications of advanced mobile technologies, including social media, emerged in the market, mobile devices provided a platform for various communicative methods and tasks. The instructional design used with mobile technologies to support MALL has to be technically simple to conform to ease of use and self-direction, but the designed courseware must still be able to deliver sophisticated pedagogies. As the design was viewed from the perspective of pedagogy rather than the functions of technology, Tai (2012) asserted that the technical features of mobile technologies are an important aspect, so design needs to be considered for a smooth transfer of knowledge to the subject domain.

Several learning theories of second language learning stresses the importance of communication (Chuo, 2004; Warschauer & Healey, 1998). Besides the individual perspective of each of the theories, the common view that holds all of them together is the essential social process of language learning. First, the input and interaction theories of second language

learning emphasize the role of social interaction for target language input, output, and interaction. These theories are based on two hypotheses. The interaction hypothesis (Long, 1981, 1983, 1996) puts efforts on the importance of language interaction to increase the understanding and usefulness of language input by the individual language learner. The output hypothesis (Swain, 1985, 1995) mentions that certain aspects (syntax and morphology) of a second language are most effectively developed during second language production. Second, within socio-cultural and activity theory (Vygotsky, 1962, 1978), language is considered a tool to transfer meaning with target speakers. Thus, the socio-cultural perspectives of second language learning consider interaction but also emphasize the social motive of second language learning.

However, these theories alone cannot help learners accomplish language learning tasks. Private speech stresses self-regulation (Frawley & Lantolf, 1985) and the speaker's personal characteristics and interests about fulfilling social interaction (Coughlan & Duff, 1994; Roebuck, 2000). For example, Vygotsky's theory on second language learning differentiated adult learners and child learners. The purpose of communication interaction from children's perspective is different from adult's perspective (Lantolf & Appel, 1994). It is also important to get feedback from native language speakers for a second language learner throughout the language learning process (Aljaafreh & Lantolf, 1994; Nassaji & Swain, 2000). Lastly, second language learners also are part of a community. With the community practice, sociolinguistic perspectives could investigate learner's identity, emotions, and social position for learning a second language (Bremer, Roberts, Vasseur, Simonot & Broeder, 1996; Heller & Makoni, 2009; Norton, 2000; Ochs, & Schieffelin, 1995; Pierce, 1995; Wenger & Lave, 1991). Moreover, when considering language learning as a situated activity from a sociolinguistic perspective, situated activity influences learning context. So mobile devices became helpful tools to support language learners

in a real-world context to have interactions with target language speakers because of the possibility of accessing information anywhere and anytime (De Jong, Specht & Koper, 2008).

Other language learning theories were task-based theories. Pica (2008) claimed task-based instruction involves "activities that engage language learners in meaningful, goal-oriented communication to solve problems, complete projects, and reach decisions" (p. 71). Based on this task-based teaching perspective, researchers designed various task-based activities and their effects were explored (Shehadeh, 2005). The fluency, accuracy, or complexity of the target language could be promoted by learners through task-based learning and the cognitive perspective emphasized the aspects of the tasks that can help learners achieve the goals (Ellis, 2000). The socio-cultural perspective, however looked from each learner's perspective and individual differences to find out how these factors affect their task performance (Shehadeh, 2005).

One of the potentials of using mobile technologies to design task-based projects was to promote social interaction (Tai, 2012). Since the ready-to-use communicative characteristics of mobile technologies were emphasized to design pedagogic tasks (Long, 2000), learners could use their reading, writing, listening, or speaking skills to finish the communication process in spoken or written forms according to the nature of the task. These forms of communication could be viewed from a cognitive approach as task characteristics (Ellis, 2000) and could affect learner performance.

Kukulska-Hulme and Shield (2007) explored using mobile devices for both learning content distribution and encouraging interaction of the second language learners in their target language environment; the authors also distinguished the two differences, in that the first is in a passive manner but the latter is in a more active manner. Most research on and experiments with

learning a second language still mainly focused on learning content vocabulary, which is one of the basics of language learning. Researchers have learned to help students to practice vocabulary learning using different mobile features. For example, Levy and Kennedy (2005) conducted research using SMS messages that were sent at particular time intervals to help students learn Italian vocabulary. Fisher, Pemberton, Sharples, Ogata, Uosaki, Edmonds and Tschorn (2009) provided an example of an extended e-book reader that allows the second language learner to instantly look up vocabulary and listen to a native pronunciation. Thornton and Houser (2005) used e-mails with English vocabulary sent to mobile devices of Japanese students; the authors investigated the effectiveness of using email and described the combination of information sent through text messages (explanations, quizzes, and video material for mobile language learning).

Most research paid attention to the more passive mobile language learning approaches of delivering learning content, but has no solutions to support target language interaction (Petersen & Divitini, 2005). To address this lack of solution, Kukulska-Hulme and Shield (2007) emphasized the importance of real-world interaction and stressed the lack of mobile language learning solutions for speaking and listening in their review of MALL. Petersen and Divitini (2005) also provided two scenarios for community-based mobile language learning, one of which focused on interaction between native speakers and non-native speakers. Tai (2012) mentioned that the instructional design of MALL should focus on pedagogy instead of technology. The use of technology is to fulfill the basic requirement of each knowledge field which means the focus should be on the subject content but not on the learning or use of technology (Ting, 2010).

Second Language Learner Attributes

Learning with mobile technologies was recognized as a useful approach in learning English as a second language (Chang, Chen & Hsu, 2011; Chen & Huang, 2010; Hwang & Chang, 2011; Lee, 2009; Sandberg, Maris & de Geus, 2011). However, these research studies mainly focused on English language content rather than students' attitudes and self-efficacy with the use of a mobile device (Yang, 2012).

With the recent emphasis on holistic approaches toward language learning, which includes the subject knowledge, technology, teaching methods and learner attributes, one is reminded that learners are not just cognitive beings. In other words, "students do not learn language content only from the cognitive window" (Breen, 2001b, p. 135). Learners are actually “multidimensional beings who have a combination of different variables that help them to learn” (Ganjabi, 2010. p. 46). For example, to learn English well, English as a Foreign Language (EFL) learners had to practice and listen to English tapes over and over again to become familiar with the language and to improve performance (Thornton & Houser, 2005). To realize the multidimensionality of English learners, both teachers' and students' beliefs and attitudes contribute an important role in the process of language learning and teaching (Brown, 2009). During the last two decades, second language learning researchers have been studying learners' attitudes, expectations, experiences, and learning strategies to decide the effect of these attributes in language learning (Brown, 2009; Derakhshan & Kaivanpanah, 2011; Williams & Burden, 1997).

However, learners’ perceptions and beliefs were found to be the underlying cause of different learning approaches when students completed a specific task. Sakui and Gaies (1999) described these beliefs as "beliefs about the nature of language, about the language-learning task,

about likely outcomes, about learners' personal language learning strengths and limitations" (p. 474).

The ubiquitousness of mobile devices can make learning easy (Yang, 2012). One study found that students have enough technical skills to read the assigned texts, post questions online, and provide comments to peers on their mobile devices (Yang, 2012). M-learning was defined as "The exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning" (MoLeNET, 2010, p. 3). Students believed that m-learning provided them with chances to acquire more information and m-learning also supported them to learn collaboratively with peers without the restriction of time and location. Students expected peers to respond to their opinions in the online discussion forum via mobile devices (Yang, 2012). Students also often took environmental pictures and made videos with authentic scenarios related to what had been learned in textbooks (Yang, 2012).

Tanaka and Ellis (2003) did an empirical study of Japanese university students 15-week study-abroad. The study examined changes in the students' beliefs about language learning (measured by means of a questionnaire) and in their English proficiency (measured by the test of English as a foreign language - TOEFL). Results showed that during the study-abroad period, there were statistically significant changes in the students' beliefs relating to analytic language learning, experiential language learning and self-efficacy/confidence. In the questionnaire, the three factors (analytic learning, experiential learning, and self-efficacy/confidence) were tested. For example, the items under analytic learning were: (a) I can learn well by following a textbook; (b) I can learn well by writing down in my notebook; and (c) memorization is a good way for me to learn English. Experiential learning included items like: (a) I can learn well by

listening to radio or watching TV in English; (b) I can learn well if I try to think in English; and (c) I can learn well by speaking with others in English. Self-Efficacy and Confidence includes items like: (a) it is possible for me not to get nervous when speaking English; (b) I am satisfied with my progress in English so far; and (c) it doesn't matter if I make mistakes when speaking with others in English. Students' TOEFL score showed students' proficiency improved after studying abroad. The results of the questionnaire showed that students' beliefs concerning all three factors were strengthened (Tanaka & Ellis, 2003).

Williams and Burden (1997) stated that "learners' perceptions and interpretations have been found to have the greatest influence on achievement" (p. 98). Since students' and teachers' beliefs may not be the same, the different beliefs that teachers and learners hold relative to the process of language teaching can negatively influence the effectiveness of a language program (Kern, 1995; Schulz, 1996).

In a study of a formative assessment design proposed by Huang, et al. (2010), PDAs were integrated as a cognitive tool to provide instructional information and feedback related to the outdoor learning tasks in an ecological observation class. The purpose of this research was for teachers to understand their students' beliefs about language learning (Ganjabi, 2010). Other studies uncovered teachers' beliefs towards language learning and teaching. Horwitz's (1999) survey instrument, BALLI (beliefs about language learning inventory) was used to test 118 pre-service EFL teachers' beliefs and the results showed that "motivations and expectations to learn" (p. 2) were found to be the most important part of EFL learning (Ganjabi, 2010). The data report also provided insight about the interrelations among the belief factors which included motivation, the nature of language learning, learning and communication strategies, foreign language aptitude and the difficulty of language learning. The Pearson correlations results

showed a strong relationship among these factors (Tercanlioglu, 2003). Altan (2006) used the BALLI questionnaire to investigate 248 pre-service teacher' beliefs and concluded that using a mobile discussion platform and knowledge of language learners' beliefs should also increase teachers' understandings of the nature of second language teaching. Discussions about the nature of language learning could be set as a regular part of their instruction, and the class could be a very effective course to confront students' erroneous beliefs with new information.

Based on the research that has been done, mobile phone technologies and applications can improve students' motivation in language learning. Mobile learning stimulates students to engage with the language learning process; thus, it has a positive impact on their study (Petersen & Markiewicz, 2010). Several researchers showed the positive impact of mobile phone technologies to language learning. For example, Attewell (2005) found that 82% of the students improved their reading comprehension and spelling skills, and 62% of the students expressed their interest in using their mobile phones continuously to learn after participating in this mobile learning project. Basoglu and Akdemir (2010) found that students had improved academic performance in learning vocabulary and had positive attitudes toward learning English vocabulary via mobile learning. Yang's (2012) results showed most students agreed that using mobile devices enhanced their motivation for English learning, and most of them had positive attitudes towards m-learning. M-learning not only created a better learning environment for students but also enhanced their learning motivation by providing advanced mobile device educational applications. Because mobile device platforms improved communication between teachers and students, teachers now know more about what students think during their learning process (Huang et al., 2010).

Use of Smartphone Outside the Classroom

Mobile phones have great potential to provide supplemental practice for students outside the formal school setting. As Thornton and Houser (2004) stated, “we believe mobile phones can help extend learner opportunities in meaningful ways” (p. 1) since the practice and exposure of communicative activities is important. This can happen not only in the traditional classroom but also anywhere at any time with the assistance of mobile phones. According to O‘Malley, Vavoula, Glew, Sharples and Lefrere (2003) mobile learning includes any kind of learning that takes place when the learner is not in a fixed place. Geddes (2004) also mentioned that mobile learning is the kind of learning which takes place at any time and in any place. Because of these attributes of mobile devices, the features and functions of mobile devices could be considered a meaningful assistance to users’ work, study and life. Huang et al., (2010) stated "For education, the context, learning process and the outcomes should be considered with an extension to the outside of the classrooms or lecture halls" (p. 1).

Alemi et al. (2012) defined MALL as a teaching method to stress learner centeredness and autonomy with mobile phone technologies, since the device takes learning outside of the classroom (Geddes, 2004), which lets students take control of their own learning. For example, students can take advantage of mobile devices to learn vocabulary by themselves anywhere, any time. In this way, students could learn and retain a large number of new words that they encounter inside and outside the classroom. Mobile devices can also be used to assist language teachers in communicating with their students. For instance, teachers can send tests to students and ask them to send the answers via text message. However, an important feature of this type of self-learning is that students have more freedom and may feel responsible for their own learning (Alemi, et al., 2012).

Summary

Technology has revolutionized the way students live their daily lives and make use of devices for both personal and learning purposes. Smartphone technology has the potential to support students' second language learning in formal classroom settings as well as non-formal settings outside of the classroom. Students are now able to access large amounts of information and carry out their academic coursework, including second language learning with mobile technologies. The phenomenon of students' self-learning on their mobile devices transformed traditional classroom learning to various other formats, such as learning by games, applications, communication and interaction with digital resources (Godwin-Jones, 2008).

Learning English as a second language includes listening, speaking, reading and writing. Recent research studied the use of specific mobile phone applications such as text messaging, email, and multimedia to help students with vocabulary learning, reading and writing (Almasri, 2013; Chinnery, 2006; Godwin-Jones,2008; Huang et al., 2010; Kennedy & Levy, 2008; Thornton & Houser, 2005).

Students' mobile phone use was noted as beneficial for learning. For example, the technology used could be self-directed, easy to use, convenient, and use push notification with small quantities of lessons (Michelsen, 2008; Pemberton, Winter & Fallahkhair, 2009). Conventional teaching materials may not help students to become self-directed and social learners who could learn anywhere and anytime (seamlessly) using mobile technologies (Zhang, Looi, Seow, Chia, Wong, Chen, …& Norris, 2010). Based on TPACK (Technology, Pedagogy, Content and Knowledge), technology and content received more research attention; however, mobile technology is still fairly new in teaching. There is quite a lot to explore, especially pedagogy. New pedagogy needs to be developed along with the new mobile technology, but the

pedagogy needs a more learner-centered focus (O'Malley et al., 2003). Language learners' habits of using smartphones, applications, and the amount of time they spend using them have become customized to their individual learning style. How smartphone technology influences or improves students' attitude and motivation is closely related to the success of adoption of specific, appropriate mobile technologies according to perceived ease of use and perceived usefulness (Davis, Bagozzi & Warshaw, 1989). Learners' beliefs, on the other hand, also played a part in their attitude and motivation (Tercanlioglu, 2003). Therefore, those learners' attitudes and ESL communication skills developed using various mobile technologies were the main focus of this research study.

CHAPTER 3

METHODOLOGY

Introduction

The main purpose of this research study was to examine international students' behaviors with their mobile phones for English learning out of class and the benefits that students perceive they might gain from using their mobile phones for English as a Second Language (ESL) learning in class in a U.S. university.

According to Creswell's (2009) quantitative research approach, the five steps of this research are "the researcher decides what to study, asks specific questions, collects numeric (numbered) data from participants, analyzes these numbers using statistics, and conducts the inquiry in an unbiased, objective manner" (p. 39). The research was designed to follow through these steps. The research methods used in this study are discussed in this Chapter. The following subsections are included: Theoretical framework for the research method used, diffusion of innovation, the technology acceptance model, research questions, quantitative variables, setting of the study, participants, instruments, reliability, validity, data collection, and data analysis.

Theoretical Framework for the Research Method

Diffusion of innovation (Rogers, 2003) was the main theoretical framework used in this study to understand students' perceptions about the usefulness of mobile-assisted language learning. Within the diffusion of innovation theory, the technology acceptance model (TAM) was used to support this study.

Diffusion of Innovation

Diffusion of innovation was developed by E. M. Rogers in 1962 and originated in communication as one of the oldest social science theories (Ndungu & Njeru, 2014). Diffusion is the process by which an innovation is communicated over time among the members of a social system through certain channels. It is a special type of communication used to spread messages that are perceived as new ideas to achieve a desired purpose. Rogers (2003) also mentioned that diffusion of innovation was a particular communication process during which the messages transmitted are designed to convey a "new idea, reduce uncertainty, provide information, and promote social change" (p. 18). For the purpose of the current study, the ultimate goal was to learn how to integrate mobile technologies to assist with English learning as a second language both inside and outside the classroom based on students'perceptions, attitudes and preferences. The innovation technology of this research was the smartphone; the ideal concept was to use the smartphone to assist international ESL students with English learning. Time was taken to plan, communicate, and design teaching methods suitable for ESL students' learning style with the new technology. As the theory applies to this study, individuals could also change from a traditional lifestyle to a more complex, technologically advanced, and modernized type of living with social change led by the diffusion of innovation. This process can be planned or happen spontaneously depending on different ideas or the social system where the changes take place (Rogers, 1969). The purpose and part of the communication process was to understand and determine students' perceptions about the issue of using smartphone technologies for ESL and give possible suggestions for future planning within the English language institute.

The four main elements in the diffusion of new ideas are: (a) the innovation, (b) the communication channels, (c) time, and (d) the social system. According to Rogers (2003), these

four elements are identifiable in all campaigns, programs, and research studies in which the diffusion of innovation is the primary objective. Innovation can be an idea, practice, or object to which the individual or unit of adoption is perceived as new (Rogers, 2003). For instance, smartphones are the potential units of adoption in the current study. Rogers (2003) also noted that technology innovation consists of two related components: hardware and software, through which the technology benefits were noticed by potential adopters in order to evaluate the perceived attributes of the innovation. Overall, the communication channel played an important integral part in the diffusion process.

The Technology Acceptance Model (TAM)

The technology acceptance model (TAM) used in this study was a supportive part of the diffusion of innovation theory. Davis (1989) proposed TAM based on the social psychology theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) that adopted the belief-attitude-intention behavior relationship. TAM has been employed to measure, predict, and explain individuals' behavior with respect to their acceptance or rejection of new technology (Davis, 1989). TAM seems to have an excellent reputation about its robustness, parsimony, and explanatory power among all the adoption theories (Mthethwa, 2014).

The theory further posits that the user's acceptance of technology is based on a function of two beliefs: a) perceived ease of use, and b) perceived usefulness (Davis et al, 1989). Perceived ease of use means a person believes that a particular technology or system is easy to use and the degree to which using the technology would be free of effort. Perceived usefulness refers to the degree to which a person believes that using a particular technology system could improve his or her job performance. Therefore, the TAM theory is appropriate for this study

because the objective of this study was to establish how students' use of smartphones resonates with their beliefs about the usefulness of smartphones for learning English. Arning and Ziefle (2007) defined technology acceptance as a user's willingness, agreement, acceptance and continuous use of information technology and the aspects can be categorized into attitude acceptance, and behavior acceptance.

The two kinds of technology convenience are product and service. For technology consumers, the convenience depends on time and effort from a product or a service (Berry, Seiders & Grewal, 2002). In other words, when a product or service saves time for a user or lowers the cognitive, emotional, and physical burdens for a user, then the product or service is considered as convenient.

Brown (1990) examined the convenience of a product or service using five dimensions including time, place, acquisition, use, and execution. Yoon and Kim (2007) examined only three dimensions and defined perceived convenience as a level of convenience toward time, place, and execution that one feels during the participation in MALL. Yoon and Kim (2007) concluded time convenience refers to how one feels more convenient toward time (e.g. performing a task at any time); place convenience refers to how one feels more convenient toward place (e.g. performing a task at any place), and execution convenience refers to how one feels more convenience toward execution when performing a task.

Because smartphone technologies have the characteristics of small size, convenience, multi-functionality, and ease-of-use, it is reasonable to assume that smartphone technologies could bring convenience to students in terms of time, space and usage to support students' acceptance and attitudes towards second language learning.

Research Questions

This study was guided by the following research questions:

1. In which specific mobile phone activities did students engage in English and for how much time each day?
2. In which skill building activities did ESL students engage on smartphones for English learning out of class?
3. What benefits did the ESL students perceive they might gain by using smartphones to learn English in the classroom?
4. To what extent were students' perceptions of using mobile phones for each English skill item in class different from students' actual behaviors on mobile phones for each English skill building out of class?

Quantitative Variables

All independent variables in this study were attributive, which means no variables were manipulated by me. Research Question 1 was used to check the smartphone ownership among ESL international students and the activities that students utilized on their smart technology devices. For Research Question 2, the dependent variable was the purposes for which students used smartphones out of class; the purpose in this case specifically focused on English skills. For Research Question 3, the dependent variable was the purposes for which ESL students believed using smartphones in class would be beneficial. Research Question 4 used a multiple comparison procedure (MCP) to examine differences among the mean scores of dependent variables reported on an interval scale of measurement. The seven independent variables from the 10 multiple choice questions were: gender, age, nationality, length of stay in the U.S., major, class level, and grade level.

Setting of the Study

The current research study was conducted with an English Language Learning Institute at a large southwestern university. The institute has a program that helps international students from all over the world study English before being officially accepted into university degree programs. Its purpose is to help international students learn English well enough to be successful in higher-level academic studies. These international students were a diverse group but most of them were equipped with basic English knowledge gained from secondary school or high school. Language is the barrier students must overcome to continue the higher education at a university in America where the native language is English. Normally students were disciplined to work in a classroom environment and follow teachers' instructions.

Finishing the English learning program is equivalent to passing TOEFL (Test of English as a Foreign Language) which is a standard test of English proficiency given to non-native English speakers. Passing TOEFL is usually required to enroll in U.S. universities. In the English language institute, the program has five eight-week terms year round: Fall I, Fall II, Spring I, Spring II, and Summer term.

According to the English language institute, there are seven levels of English proficiency classes from beginner (Level 0) to advanced (Level 6). Students need to graduate from Level 6 to be able to study in a program in their field. Within the seven levels of classes ranging from level 0 to level 6, there are two different classes in each level: one is a writing class that helps students with academic writing such as articles, class papers and essays. The other class is a communication class, a comprehensive skill-based class, which includes reading, vocabulary expansion, listening, speaking, and various other interactive activities for students to practice English communication with peers and other native speakers under differing circumstances.

There is also a supplementary language laboratory class, which is held in a computer-based technology setting and is for individual practice of listening, speaking, or spelling.

The participating English language institute offers a variety of English programs to help international students develop English communication and academic skills. The Academic English Program offers English courses that prepare international students specifically for academic studies at the university. Students attend 23 hours of class per week, Monday through Friday. In addition to the class schedule, students need to spend between 15 and 20 hours per week on homework assignments. Instructors offer office hours to help students outside of class. There are two core classes: the communication classes focus on reading, listening, speaking, pronunciation, vocabulary, and critical thinking skills; writing classes focus on writing, grammar and library research. The classrooms are located in the center of campus. The English language institute was founded in 1977. Since then, the institute has developed prestigious programs to help international students prepare academic skills in English in communication and academic environments. With the recognition of its high standard of education, long reputation and adaptable environment, the institute was an ideal school setting for this research study about international students' English learning process as a second language.

Participants

Participants in this study were ESL students from the intensive English language institute mentioned above. Students from the institute came from different countries around the world to study English preparation courses. The program has seven levels numbered level 0 to level 6. Students began the program by taking a placement test to determine the level of class in which each student could begin. After passing different assessments through each eight-week semester,

the students could move on to a higher level until all six levels were finished. In the current study, some of the students in the program through the current semester (second term in the fall semester of 2016) were recruited to take the survey instrument. Based on regular reviews from previous semesters, the program normally enrolls 200 - 400 students each semester. The survey was distributed to some of the students on their break time or through their lab classes. Students took the survey based upon their willingness to participate. A pilot study with a small group of students was conducted to calculate the power and effect size to determine the number of participants suitable for the study.

Instruments

The study used 10 multiple choice questions and a 20-item Likert scale to collect and answer the quantitative research questions. Likert scales can be used to "quantify results and obtain shades of perceptions" (Martin, 2011, p. 56). Questionnaires were classified as self-reporting instruments in most literature. In self- reporting instruments such as questionnaires, participants provided information directly to the instrument as required (Colton & Covert, 2007). In other words, participants completed questions by selecting optional items that apply to them from a given list. According to Colton and Covert (2007), questionnaires are normally used to obtain "factual information, support observations, or access attitude, and opinions" (p. 5). For the current study, the questionnaire was divided into three parts. Students answered 10 multiple choice questions in Part 1. They then completed Part 2 and Part 3 with a Likert scale of measurement ranging from 1 to 5, with 1 representing the lowest score and 5 representing the highest score. The value increased by one unit, therefore the numbers were in a more ascending continuum, meaning the higher score represents a higher endorsement of the statement.

In the questionnaire, Part 1 asked participants about demographic information including gender, age, nationality, length of time in the U. S., major, class level, and the type of phone as personal device, operating system and applications that participants used and for how much time each day?. Part 2 and Part 3 was a survey instrument used from a previous research study (Mthethwa, 2014), which the author gave permission for use (Appendix B). Part 2 questions asked participants how often they use smartphones out of class for English skill building activities. Ten items in this part were listed as follows: (1) to check pronunciation of unfamiliar words; (2) to check meanings of word definitions; (3) to look for synonyms of English words; (4) to find exemplar sentences; (5) to do grammar exercises; (6) to do vocabulary exercises; (7) to listen to English; (8) to speak in English; (9) to write in English; and (10) to read in English. The continuum for each level of the independent variable ranged from: (1) never; (2) rarely; (3) sometimes; (4) usually; and (5) most of the time. Part 3 asked participants about students' perceptions on what benefits that learners might gain by using mobile phone technologies in class. Ten items in the part were listed as follows: (1) improving students' pronunciation; (2) improving students' writing; (3) improving students' listening; (4) improving students' English grammar; (5) improving students' vocabulary; (6) improving students' reading skills; (7) improving students' speaking; (8) checking the use of English words; (9) checking synonyms of English words; and (10) checking meanings of unfamiliar words. The continuum options on each item for participants to choose from were listed as: (1) not beneficial; (2) slightly beneficial; (3) moderately beneficial; (4) quite beneficial; and (5) very beneficial. The quantitative variables were assumed to be interval since the items were rated on a 5-point Likert scale with higher values indicating more endorsement of the statement based on Steven's scale of measurement (Gamst, Meyers, & Guarino, 2008).

Reliability and Validity

Reliability refers to the "consistency or stability of the scores derived from an instrument while validity refers to the accuracy of the interpretation of the scores" (Johnson & Christensen, 2012. p. 137). The quantitative instrument in the current study used items adapted from an instrument used previously and permission to use the items was granted by the author. The items had an internal reliability of *alpha* = .880 (standardized .923), which indicates a good internal consistency. A pilot study was also conducted with 20 participants to test the validity, reliability and internal consistency of the instrument. The 42 items in the survey instrument had an internal reliability of alpha = .874 (standardized .892). According to George and Mallery (2009), a value of "*alpha* > .8 indicates good internal consistency" (p. 231). Reliability and validity are the most important psychometric properties of an instrument.

Data Collection and Procedure

The data collection procedure was formed based on the diffusion of innovation theory. There was effort put into the communication with the English language institute. Communication took place within two years from the beginning of contact with the language institute to the end of the final data collection. In the current study, the main innovation was the smartphone/mobile phone, including hardware and software. The hardware means different phone devices and software included a variety of phone applications. The main purpose of using this innovative technology was for English learning as a second language, and the participants were international college/adult students who studied at the intensive ESL program in the institute. The two years were used to contact the teachers, communicate with them to learn their current understanding of smartphone technologies and the teaching methods involving the smartphone. Class observation

and pilot study of surveying students was used to understand their class environment. Several trips and meetings were made to explain innovation technologies, research ideas and research agenda to a few lead teachers, the lab/technology manager, and administrative personnel. Time was also taken to communicate with the dissertation committee about the ideas, studies and the research situation of English studies in the language institute. The time was also used to complete the final writing, editing and defending of the proposal. Before data collection, the University of North Texas Institutional Review Board (IRB) application was submitted and approved (Appendix C).

The survey was developed on Qualtrics® and was distributed to participants through an online portal. There were two proposed Options for the data collection:

Option 1: Survey instruments were distributed to each student in each communication classroom. The purpose of the research project was explained to students and they were asked to sign the informed consent form provided they were willing to participate. Participants were then asked to complete the survey. The data were collected after students completed the questionnaire. In most cases, the process took about 20 minutes.

Option 2: Surveys, along with other official documents were distributed to the students who came to the lab classes and I explained the purpose of the research project to the students. After students understood the procedure, those who agreed to participate signed the informed consent form, then the students were asked to complete the survey, which took 10-15 minutes. The data was collected automatically after students completed the questionnaire in the Qualtrics® portal.

The final process of data collection was: the electronic survey in Qualtrics® was distributed two ways: for the Level 1, Level 2 and Level 6 students, the electronic survey was

distributed in their lab classes on the computers to a total of 25 students. One student didn't submit the survey. Because the higher level students (Level 3, 4, & 5) had a more intensive class schedule with no lab class, the research could not be arranged during their class time. Therefore, for Levels 3, 4 & 5 students, I set up a booth table with tablets in the hallway and instructed these students to complete the survey during their break time. This was done during their final week of that term (second term of fall 2016). A brief explanatory announcement about the survey and the research study was given to the participants before distributing the survey. Also a human subject consent form was pulled up on the screen before entering into the survey portal. The 25 students from Levels 1, 2 & 6 completed the survey within 10 minutes during their class time. A total of 39 students from Levels 3, 4, & 5 participated in the survey during their break time.

Data Analysis

Data from questionnaires were analyzed using Qualtrics® and SPSS®. Descriptive and inferential statistics were used to analyze the data and quantitative questions. Descriptive statistical analysis was used to describe the results from the data for Research Questions 1, 2 and 3. For Research Question 4, descriptive statistics and paired sample *t*-tests were used to establish if there were significant differences between the English skills for which students used their mobile phone out of class and the English skills for which students believed using smartphones in class would be beneficial. The paired sample *t*-tests were used because each participant was measured twice on each variable, i.e., out of class and in class. There were 10 English skills measured accordingly for out of class and in class variable and the different scores were normally distributed in the population. The scores were assumed to be independent of each other. Therefore, the paired sample *t*-tests were appropriate for comparing the means, standard

deviations, and performing the tests of significance. In addition, the Cohen's d effect size was calculated for each *t*-test using the formula M1 - M2 / pooled *SD* (Cohen, 1998).

Limitations and Delimitations

Limitations are the potential weaknesses that cannot be controlled by the researcher, yet may influence the results of a study (Creswell, 2009). This study was limited by the fact that the independent variables were attributive. In other words, I could not control any of the independent variables including any attributes of students, technologies or the subject. Secondly, the sample size was limited to the English Language Institute in a large southern U.S. university; the results may not be generalized to all the international students in the U.S.

Creswell (2009) posits that the scope of a study can be delimited by a specific size of the sample group, a set of variables, or the type of research design. It is important to define its scope by showing the delimitations of what was included and excluded (Creswell, 2009; Mauch & Birch, 1993). In the current study, the sample participants included some of the international students in the English language Institute at one university in a large southwestern state of U.S. The institute normally has about 200 to 400 students each semester. According to the power and effect size calculation for the paired sample *t*-test in this case, if the *p* value is equal or less than .05, the test would be considered significant. Based on Cohen's d effect size calculation formula: M1 - M2/pooled *SD*. The sample size of 400 international students is considered a large size. The sample size of 200 students is considered as a medium size. The focus of the current study was using smartphones for learning English as a second language; thus, the study may not apply to using a smartphone to learn other subjects, such as science, math, geography, or history.

CHAPTER 4

RESULTS

Introduction

This chapter discusses the results of the study with an analysis of the quantitative data collected in the electronic survey. Descriptive and inferential statistics were used to analyze the quantitative data. The research questions are restated for linking them to the results. The research questions are answered in the order in which they were listed in Chapter 3.

Preliminary Data Analysis

Quantitative Data

Before analysis, responses for the quantitative section were scored based on a scoring procedure that ranged from 1 to 5. An electronic survey on Qualtrics® was used and each question was set up as forced response before going to the next question, so there were no missing values found in the participants' data. Descriptive statistics including histograms, boxplots, and q-q plots were used to examine the accuracy of data entry, extreme outliers and assumptions for paired sample *t*-tests. Ten paired sample *t*-tests were performed to examine mean differences between out of class and in class variables. As a result, parametric statistics were deemed appropriate for this type of data.

The study was partially replicated from a study about utilizing mobile phones for ESL learning from the country of Swaziland (Mthethwa, 2014). A replicated study involves repeating an experiment with the same participants, methodology and instrument or applying the same methodology and instrument to another group of people and in another context after a significant delay (Spector, 2009). This current study adapted 20 items from the survey instrument of the

previous research and did the study with participants in a U.S. University 2 years after the previous study. The previous study in Swaziland concluded that students believed using mobile phone technologies in class was beneficial to them. Significant differences were found between the purposes of using smartphone technologies for ESL learning out of class and students' beliefs about the same purposes of using smartphone technologies in class. The items to test English learning purposes were adapted in the survey of the current study, but the ESL program was at a different university setting in the U.S. In addition, the time duration of usage of mobile phone applications was also examined. This was suggested from the previous study to test certain smartphone features and applications that students had already used for the purpose of ESL learning. A total of 64 participants completed the survey. In addition to the survey questions, participants provided some demographic data. The demographic age information of the participants, separated by gender, are displayed in Table 1.

Table 1

Participants' Age Information

Gender	*N*	Mean Age	Minimum Age	Maximum Age
Males	28	22.9	18	33
Females	36	23.9	17	44
Total	64			

According to the data showing in Table 1, 28 were male students and 36 were female students among the 64 students who participated in this study. The mean age was 23 for males and 24 for females. Overall, the minimum age was 17 and maximum age 44, both among the female group. The minimum age and maximum age for the male group was 18 and 33.

Results of the Quantitative Questions

> What specific mobile phone activities did ESL students do in English and for how much time each day?

A list of activities was provided that students could do using smartphone technologies. For Research Question 1, the options for the time duration of activities that students performed on their mobile phone every day were provided. The six choices for the time range were: 0 minutes; more than 0 but less than 30 minutes; 30 to less than 90 minutes; 90 to less than 180 minutes; more than 3 hours; and more than 5 hours. Table 2 contains a summary of the data collected for this question.

According to the numeric data presented in Table 2, the three highest numbers of users of phone features were 45, 44 and 31 and these numbers all fell into the category of more than 0 but less than 30 minutes per day. To further explain, among the activities that participants performed every day for more than 0 but less than 30 minutes per day, 45 people (70%) responded reading email; 44 people (69%) responded writing email, and 31 people (48%) responded reading books/news. Playing games did not appear to be a very popular activity among these participants since 30 people (47%) responded that they spent 0 minutes each day playing games. In the two categories of the longest time duration, which included more than 3 hours per day and more than 5 hours per day, the highest numbers were 12 responses (19%) for listening to music, 10 responses (16%) for watching video, 10 responses (16%) for social networking and finally, 9 (14%) of the respondents used their smartphones for social networking more than 5 hours per day. In addition, there was an open ended question regarding the other applications that students used and 10 people responded.

Table 2

Phone Features Being Used with Time Duration Each Day

Question	0 Minute	More than 0 But less than 30 minute	More than 30 but less than 90 minutes	More than 90 but less than 180 minutes	More than 180 minutes (3 hrs)	More than 300 minutes (5 hrs)	Total
Text Messaging	10.94% 7	42.19% 27	28.13% 18	7.81% 5	3.13% 2	7.81% 5	64
Talking	1.56% 1	43.75% 28	26.56% 17	12.50% 8	10.94% 7	4.69% 3	64
Facetime/ Video Chat	32.81% 21	35.94% 23	17.19% 11	6.25% 4	3.13% 2	4.69% 3	64
Reading Email	1.56% 1	70.31% 45	17.19% 11	9.38% 6	0.00% 0	1.56% 1	64
Writing Email	9.38% 6	68.75% 44	10.94% 7	9.38% 6	0.00% 0	1.56% 1	64
Using a Dictionary	7.81% 5	45.31% 29	23.44% 15	15.63% 10	4.69% 3	3.13% 2	64
Searching on the Internet	3.13% 2	23.44% 15	34.38% 22	20.31% 13	9.38% 6	9.38% 6	64
Reading Books/News	10.94% 7	48.44% 31	20.31% 13	12.50% 8	6.25% 4	1.45% 1	64
Listening to Music	9.38% 6	23.44% 15	29.69% 19	9.38% 6	18.75% 12	9.38% 6	64
Playing Games	46.88% 30	26.56% 17	10.94% 7	4.69% 3	3.13% 2	7.81% 5	64

Watching Videos	7.81% 5	26.56% 17	25.00% 16	18.75% 12	15.63% 10	6.25% 4	64
Social Network (Facebook, Twitter, Instagram, Wechat, etc.)	4.69% 3	20.31% 13	25.00% 16	20.31% 13	15.63% 10	14.06% 9	64
Using an English learning app	17.19% 11	32.81% 21	28.13% 18	17.19% 11	3.13% 2	1.56% 1	64
Other (specify)	57.81% 37	18.75% 12	9.38% 6	7.81% 5	1.56% 1	4.69% 3	64

Table 3 lists the text entries from the 10 responses.

Table 3

Other Phone Features Being Used

Other (Specify)
Soccer
No
Na
What's app
Speaking with American friends
Talk with group
X
talk with my husband
talk with children (sic)
no
To cook and shopping
do some sports
using applications
Snapchat (sic)

Of the 10 responses, six entries were talking and chatting applications with family or friends from “0 to 30 minutes” to “more than 3 hours” per day; two responded with sports, such as soccer for “90 to 180 minutes” and sports for “0 to 30 minutes;” one entry was cooking and shopping for “30 to 90 minutes;” one entered using applications for “30 to 90 minutes” but did not specifically state what the applications were. Figure 1 shows the time duration in each category of different activities on the phone device.

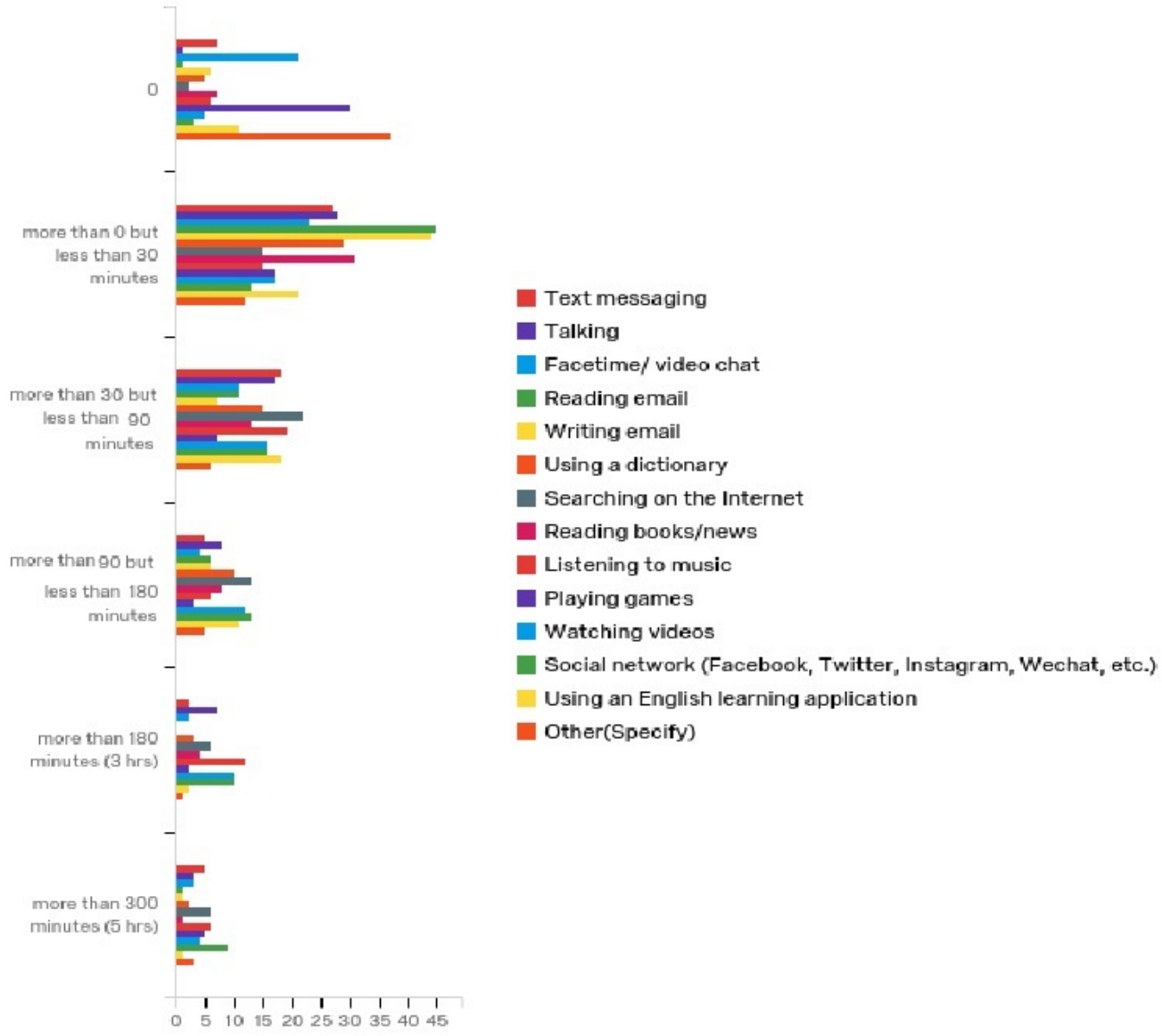

Figure 1. Time duration of phone features being used.

The bar graph in Figure 1 shows that the second category had the highest number of users of the activities that participants did for more than 0 but less than 30 minutes per day. According to the bar graph in Figure 1, the six top ranked activities were reading email, writing email, reading books/news, using a dictionary, talking and texting.

What were the skill building activities that ESL students did on smartphones for English learning out of class?

The independent variable for Research Question 2 was out of class. The 10 items for English skill building activities were listed in the questionnaire as follows: (1) to check pronunciation of unfamiliar words; (2) to check meanings of word definitions; (3) to look for synonyms of English words; (4) to find exemplar sentences; (5) to do grammar exercises; (6) to do vocabulary exercises; (7) to listen to English; (8) to speak in English; (9) to write in English; and (10) to read in English.

The optional answers for this question were on a 5- point Likert scale, where 1 = *never*, 2 = *rarely*, 3= *sometimes*, 4 = *usually*, and 5 = *most of the time* (Appendix A). Descriptive statistics were used to calculate the differences on the means and standard deviations among the variables. Table 4 summarizes statistical data of the responses for Research Question 2.

From the responses, the highest numbers fall into the categories of “Usually” and “Sometimes.” That is, 29 people (45%) responded that they usually used their mobile phone devices for the purpose of checking the meaning of unfamiliar English words definitions; 27 people (42%) usually used the device for the purpose of listening to English; 26 people (41%) usually used the device for the purpose of reading in English and 26 people (41%) sometimes used it for the purpose of checking the pronunciation of unfamiliar or difficult words.

Table 4

Out of Class Skill Building Activities on Mobile Phones

Question	Never	Rarely	Sometimes	Usually	Most of the time	Total
Checking the pronunciation of unfamiliar or difficult word	10.94% 7	18.75% 12	40.63% 26	23.44% 15	6.25% 4	64
Checking the meaning of unfamiliar English words definitions	1.56% 1	9.36% 6	29.69% 19	45.31% 29	14.06% 9	64
Looking for synonyms of English words	4.69% 3	17.19% 11	39.06% 25	29.69% 19	9.38% 6	64
Finding example sentences of English words	10.94% 7	21.88% 14	31.25% 20	31.25% 20	4.69% 3	64
English grammar exercises	14.06% 9	25.00% 16	31.25% 20	26.56% 17	3.13% 2	64
Vocabulary exercises	6.25% 4	23.44% 15	29.69% 19	34.38% 22	6.25% 4	64
Listening to English	4.69% 3	10.94% 7	35.94% 23	42.19% 27	6.25% 4	64
Speaking in English	10.94% 7	23.44% 15	25.00% 16	35.94% 23	4.69% 3	64
Writing in English	7.81% 5	21.88% 14	34.38% 22	28.13% 18	7.81% 5	64
Reading in English	3.13% 2	15.63% 10	35.94% 23	40.63% 26	4.69% 3	64

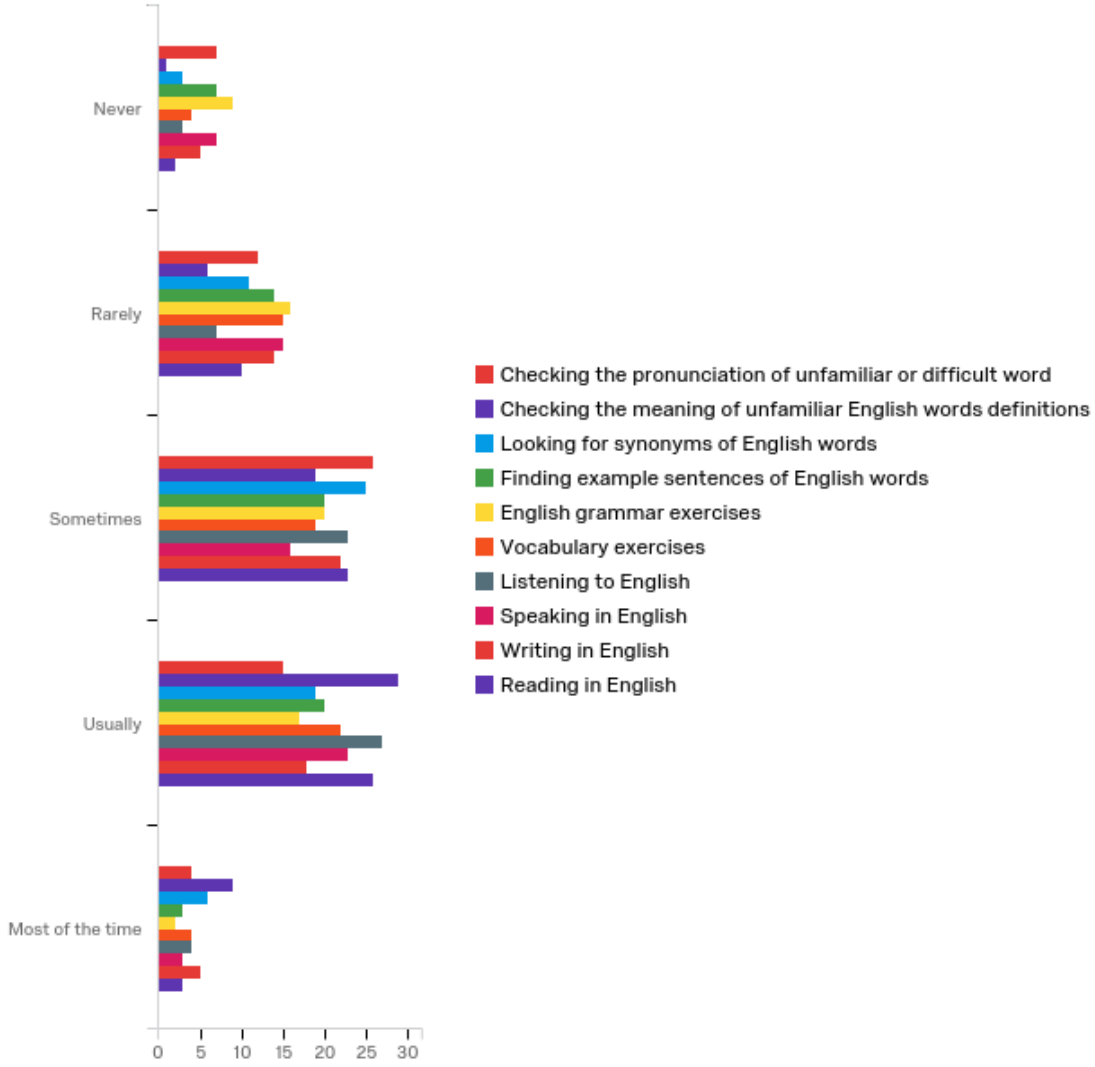

Figure 2. Frequencies of English skill building activities.

Figure 2 presents the numeric data in Table 4 using a bar graph. The top three items listed in the category “usually” are “check the meaning of unfamiliar English words definitions,” “reading in English,” “listening to English.” In the category “sometimes,” the top three items listed are “check the pronunciation of unfamiliar or difficult word,” “looking for synonyms of English word,” “listening to English” (36%) or “reading in English” (36%).

The mean scores and standard deviations were calculated for each item in Part 2 of the survey (Appendix A) and the result displayed in Table 5. Part 2 is the academic purpose for

which most participants used smartphones out of class. Based on the Steven's scale of measurement, the quantitative variables were considered interval and assumed equal distance between each score (1 to 5). Likert (1932) stated "If five alternatives are used, it is necessary to assign values from one to five with the three assigned to the undecided position," which is dependent on the individual researcher. Therefore, in this case, according to the 5-point Likert scale used with the middle point being 3, 2 = *rarely* is considered low, and 4 = *usually* is considered high, the cut-off values for the mean scores were set by the researcher as follows: 1 - 2.5 ranked "low," 2.5 - 3.5 ranked "average," and 3.5 - 5 ranked "high."

Table 5

Out of Class Variable Descriptive Statistics

English Skills	*N*	Minimum	Maximum	Mean	Std. Deviation
Checking the pronunciation of unfamiliar of difficult word	64	1	5	2.95	1.061
Checking the meaning of unfamiliar English words definitions	64	1	5	3.61	.902
Looking for synonyms of English words	64	1	5	3.22	1.000
Finding example sentences of English words	64	1	5	2.97	1.083
English grammar exercises	64	1	5	2.80	1.086
Vocabulary exercises	64	1	5	3.11	1.041
Listening to English	64	1	5	3.34	.930
Speaking in English	64	1	5	3.00	1.113
Writing in English	64	1	5	3.06	1.067
Reading in English	64	1	5	3.28	.899

The highest mean score was checking the meaning of unfamiliar English word definitions (M = 3.61) which is rated high according to the cut-off value 3.5 -5 "high" as mentioned earlier. The mean of 3.61 indicates participants' high preference. Other purposes for which participants used

smartphones out of class were: listening to English (*M* = 3.34); reading in English (*M* = 3.28); looking for synonyms of English words (*M* = 3.22); vocabulary exercises (*M* = 3.11); writing in English (*M* = 3.06); speaking in English (*M* = 3.00); finding example sentences of English words (*M* = 2.97); checking the pronunciation of unfamiliar or difficult words (*M* = 2.95); and English grammar exercises (*M* = 2.80). It should be noted that no mean scores in this category rated lower than average. To conclude, 9 items out of 10 were rated average (2.5 to 3.5) besides the one item rated high. This indicates the 64 participants used their smartphones to check the meaning of unfamiliar English word definitions more than for any other purpose. The data illustrates the important value of smartphone technologies to students for the purposes of ESL learning outside of class.

> What benefits did the ESL students perceive that they might gain by using smartphones to learn English in the classroom?

The intent of Research Question 3 was to examine the purposes for which ESL students believed that smartphones could be used in class. When examining this research question, the independent variable was *in class,* and the items listed for the independent variable were as follows: (1) improving students' pronunciation; (2) improving students' writing; (3) improving students' listening; (4) improving students' English grammar; (5) improving students' vocabulary; (6) improving students' reading skills; (7) improving students' speaking; (8) improving students' grammar; (9) checking synonyms of English words; and (10) checking meanings of unfamiliar words.

Participants completed a 5–point Likert scale question in Part 3 of the survey (Appendix A) where 1 = *not beneficial*, 2 = *slightly beneficial*, 3 = *moderately beneficial*, 4 = *quite beneficial*, and 5 = *very beneficial*. To answer this research question, descriptive statistics were

used to find the differences in means and standard deviations among the variables. The values for the *mean* scores were aggregated as follows: 1 - 2.5 “low,” 2.5 - 3.5 “average” and 3.5 - 5 “high.” The responses for this research question are summarized in Table 6.

As shown in Table 6, the three top frequencies were in the category of “moderately beneficial.” The numeric data were 26, 23 and 22, which means 26 people (41%) believed that smartphone technologies were moderately beneficial for “improving English grammar,” 23 people (36%) believed that smartphone technologies were moderately beneficial for “checking the use of English words in sentences,” and 22 people (34%) believed that smartphone technologies were moderately beneficial for “improving reading skills in English.” In the category of “very beneficial,” 18 people (28%) believed that smartphone technologies were very beneficial for checking the meaning of unknown English words; 14 people (22%) believed that smartphone technologies were very beneficial for improving vocabulary knowledge.

Table 6

Perceptions of Potential Benefits in Class

Question	Not beneficial		Slightly beneficial		Moderately beneficial		Quite beneficial		Very beneficial		Total
Improving pronunciation in English	10.94%	7	21.88%	14	25.00%	16	23.44%	15	18.75%	12	64
Improving writing in English	9.38%	6	14.06%	9	32.81%	21	28.13%	18	15.63%	10	64
Improving listening skills in English	3.13%	2	14.06%	9	34.38%	22	28.13%	18	20.31%	13	64
Improving English grammar	6.25%	4	18.75%	12	40.63%	26	21.88%	14	12.50%	8	64
Improving vocabulary knowledge	3.13%	2	9.38%	6	31.25%	20	34.38%	22	21.88%	14	64
Improving reading skills in English	4.69%	3	15.63%	10	34.38%	22	26.56%	17	18.75%	12	64
Improving speaking skills in English	7.81%	5	23.44%	15	26.56%	17	23.44%	15	18.75%	12	64
Checking the use of English words in sentences	7.81%	5	12.50%	8	35.94%	23	25.00%	16	18.75%	12	64
Checking synonyms for English words	9.38%	6	14.06%	9	28.13%	18	29.69%	19	18.75%	12	64
Checking the meaning of unknown English words	4.69%	3	14.06%	9	23.44%	15	29.69%	19	28.13%	18	64

Figure 3 presents the numeric data in Table 6 using a bar graph.

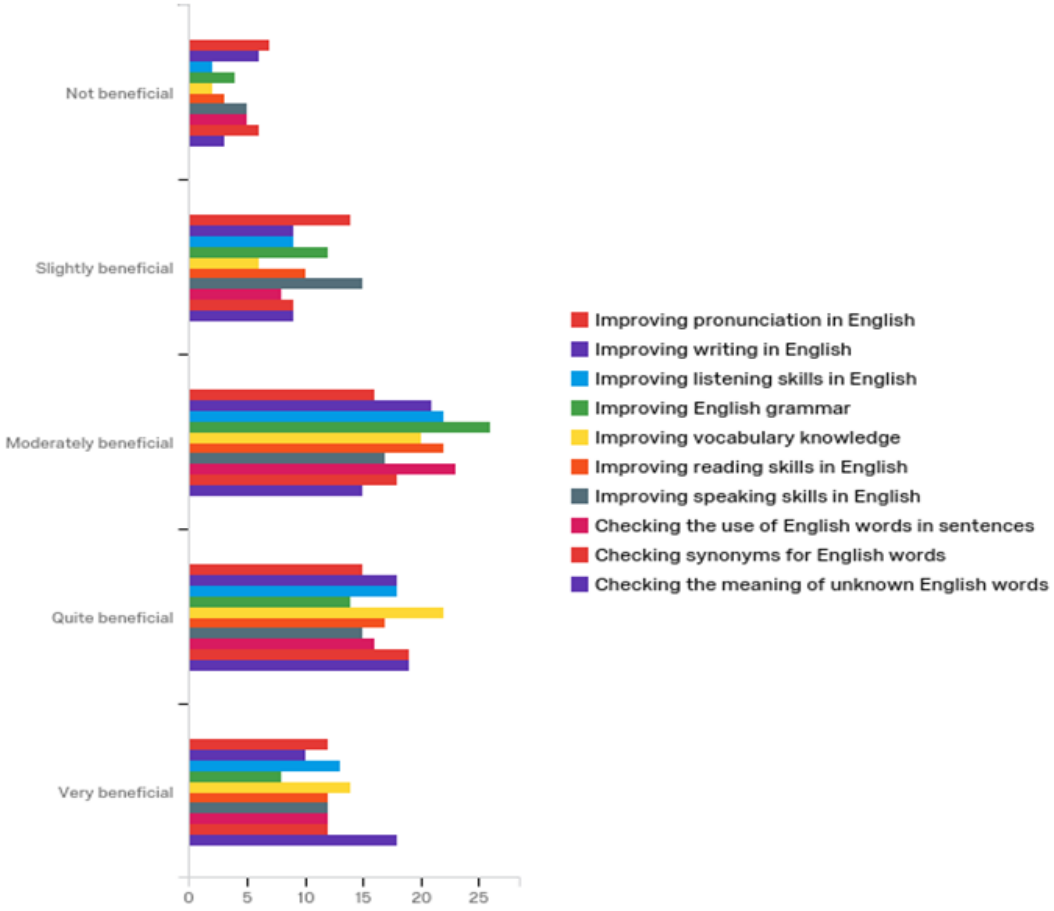

Figure 3. Possible benefits of using smartphones in ESL class.

Figure 3 shows results indicating that most people believed that smartphone technologies could be moderately beneficial, quite beneficial, and very beneficial to assist them with certain English skills in class such as English grammar (moderately beneficial), vocabulary knowledge (quite beneficial) and checking the meaning of unknown English words (very beneficial).

Table 7 presents descriptive statistics of the result for this Research Question 3. The data includes the mean score and standard deviation of each item in Part 3 of the survey (Appendix A). The result shows two mean scores were rated high and the remainder of the mean scores were rated average.

Table 7

In Class Variable Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Improving pronunciation in English	64	1	5	3.17	1.279
Improving writing in English	64	1	5	3.27	1.172
Improving listening skills in English	64	1	5	3.48	1.069
Improving English grammar	64	1	5	3.16	1.072
Improving vocabulary knowledge	64	1	5	3.63	1.031
Improving reading skills in English	64	1	5	3.39	1.107
Improving speaking skills in English	64	1	5	3.22	1.228
Checking the use of English words in sentences	64	1	5	3.34	1.158
Checking synonyms for English words	64	1	5	3.34	1.211
Checking the meaning of unknown English words	64	1	5	3.63	1.175

In Table 7, the two mean scores, which were rated higher were checking meanings of unknown words and improving vocabulary which both had a mean of 3.63. The other items were

improving listening in English (*M* = 3.48); improving reading in English (*M* = 3.39); checking the use of English words in sentences and checking synonyms for English words (*M* = 3.34); improving writing in English (*M* = 3.27); improving speaking skills in English (*M* = 3.22); improving pronunciation (*M* = 3.17), and improving English grammar (*M* = 3.16). It should be noted that no mean scores in this category rated lower than average. In other words, participants believed that using smartphones in class was beneficial for the purposes listed.

> To what extent was students' perceptions of using mobile phones for each English skill item in class different from students' actual behaviors on mobile phones for each English skill building out of class?

To answer Research Question 4, paired sample *t*-tests were generated from SPSS® to compare the means across all the out of class and in class variables. Overall, 10 paired sample *t*-tests were calculated to examine if the purposes for which students used their smartphones out of class for English learning were significantly different from the purposes for which students thought smartphones would be beneficial in class to learn English. The formula for conducting the paired sample *t*-tests was .5/10 =.05. In this case, if the *p* = value was less than or equal to .05, the test was considered statistically significant. A summary of the results of the paired sample *t*-tests, including Cohen's d effect size calculated using the formula M1 - M2/pooled *SD* are displayed in Table 8. According to Cohen's d effect size calculation, the sample size is considered a small to medium effect size.

Table 8

Paired Samples t-*Test*

		Paired Differences					*t*	*df*	Sig. (2-tailed)	Cohen's d
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
					Lower	Upper				
Pair 1	Q10_1 – Checking the pronunciation of unfamiliar or difficult word Q24_1 – Improving pronunciation in English	-.219	1.161	.145	-.509	.071	-1.507	63	.137	-.19
Pair 2	Q10_2 – Checking the meaning of unfamiliar English words definitions Q24_2 – Checking the meaning of unknown English words	-.016	1.120	.140	-.295	.264	-.112	63	.911	-.01
Pair 3	Q10_3 – Looking for synonyms of English words Q24_3 – Checking synonyms of English words	-.125	1.134	.142	-.408	.158	-.882	63	.381	-.11
Pair 4	Q10_4 – Finding example sentences of English words Q24_4 – Checking the use of English words in sentences	-.375	1.162	.145	-.665	-.085	-2.583	63	.012*	-.32
Pair 5	Q10_5 – English grammar exercises Q24_5 – Improving English grammar	-.359	1.160	.145	-.649	-.070	-2.479	63	.016*	-.31
Pair 6	Q10_6 – Vocabulary exercises Q24_6 – Improving vocabulary knowledge	-.516	1.333	.167	-.849	-.183	-3.094	63	.003*	-.39
Pair 7	Q10_7 – Listening to English Q24_7 – Improving listening skills in English	-.141	1.082	.135	-.411	.130	-1.040	63	.302	-.13
Pair 8	Q10_8 – Speaking in English Q24_8 – Improving speaking skills in English	-.219	1.291	.161	-.541	.104	-1.356	63	.180	-.17
Pair 9	Q10_9 – Writing in English Q24_9 – Improving writing in English	-.203	1.324	.165	-.534	.127	-1.228	63	.224	-.15
Pair 10	Q10_10 – Reading in English Q24_10 – Improving reading skills in English	-.109	1.056	.132	-.373	.154	-.829	63	.410	-.10

Note: * = significant at alpha < .05

The results in Table 8 showed three pairs were significantly different ($p < 0.05$). The three pairs were vocabulary exercise (Pair 6), example sentences of English words (Pair 4) and English grammar (Pair 5). To further explain, the mean for students' perceptions of using smartphones in class for vocabulary knowledge ($M = 3.63$, $SD = 1.03$) was significantly higher than the mean for vocabulary exercise out of class ($M = 3.11$, $SD = 1.04$); t (63) = -3.09, p = 0.003 < .05, $d = 0.39$; the mean for students' perspectives of using smartphones in class for checking the use of English words in sentences in class ($M = 3.34$, $SD = 1.158$) was significantly higher than finding example sentences of English words out of class ($M = 2.97$, $SD = 1.083$), t (63) = -2.583, p = 0.012 < .05, d = -0.32; The mean for students' perceptions of using smartphones in class for improving English grammar in class ($M = 3.16$, $SD = 1.072$) was significantly higher than using smartphone for grammar exercise out of class ($M = 2.80$, SD = 1.086), t (63) = -2.479, p = 0.016 < .05, $d = 0.31$.

Table 9 contains the results from the 10 paired sample t-tests by comparing the mean scores and standard deviations between the purposes for which participants used smartphones out of class and the purposes for which students thought of using smartphones in class.

Table 9

Paired Sample Statistics

		N	Mean	Std. Deviation	Std. Error Mean
Pair 1	Q10_1 – Checking the pronunciation of unfamiliar or difficult word	64	2.95	1.061	.133
	Q24_1 – Improving pronunciation in English	64	3.17	1.279	.160
Pair 2	Q10_2 – Checking the meaning of unfamiliar English words definitions	64	3.61	.902	.113
	Q24_2 – Checking the meaning of unknown English words	64	3.63	1.175	.147

Pair 3	Q10_3 – Looking for synonyms of English words	64	3.22	1.000	.125
	Q24_3 – Checking synonyms of English words	64	3.34	1.211	.151
Pair 4	Q10_4 – Finding example sentences of English words	64	2.97	1.083	.135
	Q24_4 – Checking the use of English words in Sentences	64	3.34	1.158	.145
Pair 5	Q10_5 – English grammar exercises	64	2.80	1.086	.136
	Q24_5 – Improving English grammar	64	3.16	1.072	.134
Pair 6	Q10_6 – Vocabulary exercises	64	3.11	1.041	.130
	Q24_6 – Improving vocabulary knowledge	64	3.63	1.031	.129
Pair 7	Q10_7 – Listening to English	64	3.34	.930	.116
	Q24_7 – Improving listening skills in English	64	3.48	1.069	.134
Pair 8	Q10_8 – Speaking in English	64	3.00	1.113	.139
	Q24_8 – Improving speaking skills in English	64	3.22	1.228	.153
Pair 9	Q10_9 – Writing in English	64	3.06	1.067	.133
	Q24_9 – Improving writing in English	64	3.27	1.172	.146
Pair 10	Q10_10 – Reading in English	64	3.28	.899	.112
	Q24_10 – Improving reading skills in English	64	3.39	1.107	.138

Figure 4 uses a bar chart to compare the mean score difference of each paired items for the purposes of using smartphone technologies out of class and the purposes for which students believed using smartphone technologies in class would be useful. From the chart, vocabulary exercise, sentences and grammar showed a significant difference between the in class setting and out of class setting.

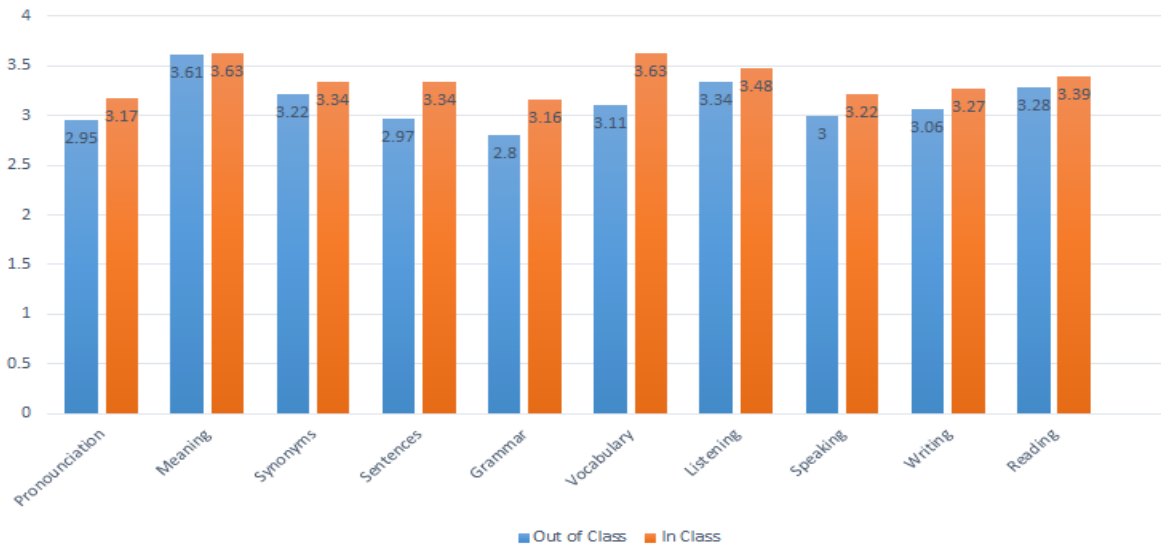

Figure 4. Out of class and in class mean difference.

From the numeric data in Table 9 and the bar graph in Figure 4, the reader can see there are no significant differences among the other paired items other than the three pairs mentioned previously. However, in the previous study, there were significant differences among other five pairs. There was a significant difference between the means for using smartphones out of class for checking word definitions and the potential benefits of using smartphones in class for the same purpose; another significant difference was between the means for using smartphones to look for synonyms of English words out of class and potentially using smartphones in class for the same purpose. There was a significant difference between the means for using smartphones to find example sentences out of class and potentially using smartphones in class for the same purpose. There was a significant difference between the means for using smartphones for doing grammar out of class and potentially using smartphones in class for the same purpose. Finally, there was a significant difference between the means for using smartphones for listening in English out of class and potentially using smartphones in class for improving listening.

CHAPTER 5

DISCUSSION

Overview of the Study

Mobile phones are popular because of their size and convenient functionalities such as searching on the Internet, reading, texting, emailing, and shopping (Scanlon, Jones & Waycott, 2005; Suki, 2007). Smartphones are small personal computers which can process information formerly performed on larger computers (Friedman, 2005). Because smartphones are cheaper than computers and easier to carry around, the devices outnumbered personal computers 5 to 10 times (Prensky, 2005). The mobility of smartphones has not only made learners free from a certain learning center such as a classroom, but mobile technologies have also blended formal and non-formal learning contexts (Yang, 2013). Smartphones are one of the information and communication technologies that have facilitated access to communication networks that stimulated the transformation of a traditional economy into a more globalized economy (Friedman, 2005; Sweeny, 2010). A common language is needed for different people to do business together. English is one of the most popular languages and many countries use English as their official language (Crystal, 2003; Graddol, 1997, 2006; Liu, Moore, Graham & Lee, 2002). Therefore, English as a second language skill is important in the globalized job market (Charkova & Charkova, 2013).

Because of this phenomena, the current study focused on using one of the advanced technology devices in education: mobile phones for the purpose of English learning as a second language. Mobile phones, specifically smartphone technologies have become an indispensable tool and have been widely used by young adults and college students (Pew Research Center, 2015). Smartphone technologies could be used to improve students' learning in multiple ways in

different course subjects. Prensky (2005) asserted that you can learn almost anything from a cell phone. Cochrane and Bateman (2010) listed the affordances of using smartphone technologies such as videoing, picture taking, blogging, and social networking for a variety of course projects including landscaping architecture, product design, contemporary music, performing and screening arts. Specific examples in Cochrane and Bateman's (2010) study were given about how using videos and blogs could help reflect and track course projects and also about lecturer's experience of increased interaction with students by using mobile web tools. For this study, English as a Second Language (ESL) is the subject to learn with the assistance of a smartphone and the literature review collection included the latest CALL and MALL related articles.

Smartphones come with a large number of functions and features, however, with so many mobile phone functions and applications, few educators or learners know which one is better than another for the purpose of ESL learning. Furthermore, students' perceptions about using the mobile technologies to learn by themselves has not been studied extensively. This research study was designed to examine students' habits and behaviors using their own mobile technology device for English study outside of class as well as their perceptions regarding use of this technology for the same purpose in the classroom. Based on the students' behaviors of using certain phone features on a daily basis, findings were drawn about certain student preferred mobile phone applications and students' perceptions about the usefulness of smartphone technologies for specific English skills.

The traditional way of learning ESL is to use textbooks. Normally teachers teach in a classroom and students practice with their course materials after class. Previous literature examined how technology could help students with their communication, interactions, and also improve performance in language learning (Chang et al, 2012; Cobb, Heaney, Corcoran &

Henderson-Begg, 2010; Markett et al., 2006). Previous literature usually focused on using certain smartphone technology applications and features such as SMS, a dictionary, and photos to help with English vocabulary learning, and also focused on teaching from a teacher-centered perspective, which let teachers decide what to teach and what technology to use. Two problems were detected based on reviewing literature in CALL and MALL. First, English language teachers might not have the computer skills or smartphone skills to apply technology to teaching English. Secondly, students or English learners' perspectives are missing about CALL and MALL, which means learners' attitudes, motivation, and purposes of using smartphone technologies to learn English are not clear, especially when most adult learners already carry smartphone devices on a daily basis. There may be a variety of ways to use smartphones for ESL from students' experiences with their mobile devices for personalized learning out of class. It is worthwhile to find out students' habits and preferences with their devices so educators may know individuals' personalized learning styles. Interviews or focus group studies with students are recommended for future studies to find out students' individualized learning with the assistance of smartphones for the purpose of English language acquisition. Therefore, before requesting that English teachers teach English using technology, researchers and educators need to work together to learn what students already use on their personal technology devices for their English learning, and incorporate that into similar classroom applications. Furthermore, a future pedagogy for ESL with smartphone technologies may be designed to meet both teachers' and students' technology needs for the ESL courses.

In addition to the data collected to answer the research questions, the survey also collected some demographic information from the participants. This information includes participants' age, gender, home country, time stay in the U.S., major, educational background,

English level, and phone device that each participant uses. The data collected could be used for future research to see the differences of the behaviors and perceptions towards using smartphone technologies for English skills building between different groups of international students such as female and male, students from different countries, students with different majors, educational level, English level, and so on. The information about gender and nationality is discussed below to see the difference among these groups.

Gender Variable

Table 10 displays the mean and standard deviation difference between two gender groups for the phone features being used and the time duration of use each day. For all the items listed in Table 10, except for the two mean scores which are using a dictionary and using an English learning application, the other mean scores of male group were higher than that of the female group. Although the difference between each corresponding pair of mean scores based on the gender variable is not significant, it might suggest a future study to test the correlation and significant differences between male students and female students. Also, while not a significant difference, the maximum score which is the selection for longest time duration and minimum score which is the shortest time duration for the male group had either an equal number or a higher number than the female group with the exception of two categories: reading books/news and using an English application where the maximum number for males group is 5 (more than 3 hours) and 4 (more than 90 minutes). This means that the male group didn't spend the longest time duration on these two activities.

Table 11 shows the data for using mobile phone technologies for English skills out of class from the two gender groups. From each of the variables listed in Table 11, the mean score

for the female group is higher than that of the male group, although not significantly. For three items: checking the meaning of unfamiliar English words, looking for synonyms and reading in English, the minimum score for the female group is 2 = “rarely,” which means no one in the female group selected 1 = “never” for these three activities. In other words, the female group did these activities for English purpose rarely.

The data in Table 12 shows the mean score of the female group is higher than each of the corresponding male scores except one score, which is improving listening skills in English; for this item, the female group had a mean of 3.47, but the male group had a mean of 3.5 which is only .03 higher. The data also implicated a possibility of a significant difference between the perceptions of the female group and the perceptions of the male group towards the potential of using mobile technologies in class to help them with each of the English skills. However, all the mean scores for both the female and male group are rated at least above average (2.5-3.5); no score rated below 2.5.

Country Variable

Country variables were divided into six groups: China, Japan, South Korea, Saudi Arabia, Mexico, and a small number of people from each of the other country that participants entered. Because the number for each one of the other countries entered is small, it did not have much representativeness. Mexico only had one participant which is too small to have representativeness. Thus, only data from the four main groups are discussed. The mean score and standard deviation was analyzed for each item among each group. Table 13 provides the demographic Question 10 about what phone features that students from different countries use and for how much time each day.

According to the mean score and standard deviation in Table 13, students from China and Saudi Arabia had higher mean scores and standard deviation for each variable, but students from Japan and Korea had lower scores. For example, students from both China and Saudi Arabia had seven standard deviation scored above one which represented a higher percentage of participants' scoring above the mean score, but students from Japan only had five scored above one, while students from South Korea only had three.

According to Table 14 for the English learning purposes out of class, the order for the mean score of variable checking the pronunciation according to each country is Japan (M = 3.38), South Korea (M = 3), China (M = 3) and Saudi Arabia (M = 2.72); for checking unfamiliar English words, the order is South Korea (M = 4), Japan (M = 3.88), Saudi Arabia (M = 3.44) and China (M = 3.1); the order for looking for synonyms is South Korea (M = 3.8), Japan (M = 3.5), Saudi Arabia (M = 3.17) and China (M = 2.8); the order for finding example sentences is South Korea (M = 3.6), Japan (M = 3.25), China (M = 3.1) and Saudi Arabia (M = 2.67); the order for English grammar is China (M = 3), South Korea (M = 3), Japan (M = 2.63) and Saudi Arabia (M = 2.61); the order for vocabulary exercise is China (M = 3.7), Saudi Arabia (M = 3.17), Japan (M = 3) and South Korea (M = 2.6); the order for listening in English is Saudi Arabia (M = 3.5), South Korea (M = 3.4), Japan (M = 3.38) and China (M = 3.3); the order for speaking in English is China (M = 3.4), Saudi Arabia (M = 3.17), South Korea (M = 2.4) and Japan (M = 2.38); the order for writing in English is Saudi Arabia (M = 3.39), China (M = 3.2), South Korea (M = 3) and Japan (M = 2.5); the order for reading in English is China (M = 3.5), Saudi Arabia (M = 3.44), South Korea (M = 3) and Japan (M = 2.88).

Table 15 shows the perceptions about the potentials of using mobile technology for English skill building activities in class based on different countries. According to Table 15, the

mean score and standard deviation of China and Saudi Arabia is higher than South Korea and Japan. Regarding vocabulary exercise and checking unknown English words, Saudi Arabia had a much higher score than China, but for grammar and checking the use of English words in sentences, China had a higher score. The sequential order of the mean score for each variable according to different country is listed as follows: For pronunciation Saudi Arabia (M = 3.33), China (M = 3.3), South Korea (M = 3) and Japan (M = 2.88); for writing in English China (M = 3.4), Saudi Arabia (M = 3.33), South Korea (M = 3.2) and Japan (M = 2.75); for listening in English Saudi Arabia (M = 3.61), China (M = 3.5), South Korea (M =) and Japan (M = 3.38); for grammar China (M = 3.4), South Korea (M = 3.4), Saudi Arabia (M = 3.17) and Japan (M = 2.75); for vocabulary knowledge South Korea (M = 4), Saudi Arabia (M = 3.94), Japan (M = 3.5) and China (M = 3.3); for reading in English China (M = 3.4), Saudi Arabia (M = 3.39), South Korea (M = 3.2) and Japan (M = 3.13); for speaking in English South Korea (M = 3.6), China (M = 3.3), Saudi Arabia (M = 3.22) and Japan (M = 2.5); for checking the use of English words in sentences South Korea (M = 3.6), China (M = 3.5), Japan (M = 3.38) and Saudi Arabia (M = 3); for checking synonyms for English words South Korea (M = 3.4), Japan (M = 3.38), China (M = 3.3), Saudi Arabia (M = 3.11); for Checking the meaning of unknown English words Saudi Arabia (M = 3.89), South Korea (M = 3.8), China (M = 3.5) and Japan (M = 3.13). A future study to test the significant differences from international students based on different nationalities is recommended.

Table 10

Phone Features Being Used with Time Duration Based on Gender Variable

Phone Features Being Used	What is your Gender?	*N*	Mean	Std. Deviation	Minimum	Maximum
Text Messaging	M	28	2.89	1.548	1	6
Text Messaging	F	36	2.61	1.103	1	6
Talking	M	28	3.11	1.37	2	6
Talking	F	36	2.94	1.12	1	5
Facetime/Video Chat	M	28	2.36	1.446	1	6
Facetime/Video Chat	F	36	2.17	1.231	1	6
Reading Email	M	28	2.5	0.962	2	6
Reading Email	F	36	2.33	0.676	1	4
Writing Email	M	28	2.39	1.066	1	6
Writing Email	F	36	2.17	0.697	1	4
Using a Dictionary	M	28	2.68	1.278	1	6
Using a Dictionary	F	36	2.78	1.072	1	6
Searching on the Internet	M	28	3.5	1.232	2	6
Searching on the Internet	F	36	3.28	1.344	1	6
Reading Books/News	M	28	2.86	1.177	1	5
Reading Books/News	F	36	2.39	1.076	1	6
Listening to Music	M	28	3.54	1.575	1	6
Listening to Music	F	36	3.17	1.424	1	6
Playing Games	M	28	2.54	1.732	1	6
Playing Games	F	36	1.83	1.276	1	6
Watching Videos	M	28	3.61	1.524	1	6
Watching Videos	F	36	3	1.219	1	6
Social Network (Facebook, Twitter, Instagram, Wechat, etc.)	M	28	3.79	1.663	1	6

Social Network (Facebook, Twitter, Instagram, Wechat, etc.)	F	36	3.53	1.276	1	6
Using an English Learning App.	M	28	2.54	1.138	1	4
Using an English Leaning App.	F	36	2.67	1.171	1	6
Other (specify)	M	28	2.21	1.397	1	6
Other (specify)	F	36	1.67	1.331	1	6

Table 11

Use of Mobile Technology for English Skill Building Activities out of Class Based on Gender Variable

Phone Features Being Used	What is your Gender?	*N*	Mean	Median	Std. Deviation	Minimum	Maximum
Checking the pronunciation of an unfamiliar or difficult word	M	28	2.79	3	1.067	1	5
Checking the pronunciation of an unfamiliar or difficult word	F	36	3.08	3	1.052	1	5
Checking the meaning of unfamiliar English words/definitions	M	28	3.57	4	0.959	1	5
Checking the meaning of unfamiliar English words/definitions	F	36	3.64	4	0.867	2	5
Looking for synonyms of English words	M	28	3	3	0.981	1	5
Looking for synonyms of English words	F	36	3.39	3	0.994	2	5
Finding example sentences of English words	M	28	2.68	3	1.09	1	5
Finding example sentences of English words	F	36	3.19	3	1.037	1	5
English grammar exercises	M	28	2.54	2.5	1.17	1	5
English grammar exercises	F	36	3	3	0.986	1	4

Vocabulary exercises	M	28	2.93	3	1.052	1	5
Vocabulary exercises	F	36	3.25	3	1.025	1	5
Listening to English	M	28	3.29	3	0.937	1	5
Listening to English	F	36	3.39	4	0.934	1	5
Speaking in English	M	28	2.86	3	1.113	1	5
Speaking in English	F	36	3.11	3	1.116	1	5
Writing in English	M	28	2.93	3	1.052	1	5
Writing in English	F	36	3.17	3	1.082	1	5
Reading in English	M	28	3.14	3	1.008	1	5
Reading in English	F	36	3.39	4	0.803	2	5

Table 12

Perceptions of Potential Benefits in Class Based on Gender Variable

Phone Features Being Used	What is your Gender?	*N*	Mean	Median	Std. Deviation	Minimum	Maximum
Improving pronunciation in English	M	28	2.93	3	1.245	1	5
Improving pronunciation in English	F	36	3.36	3.5	1.291	1	5
Improving writing in English	M	28	3.11	3	1.257	1	5
Improving writing in English	F	36	3.39	3.5	1.103	1	5
Improving listening skills in English	M	28	3.5	4	1.072	1	5
Improving listening skills in English	F	36	3.47	3	1.082	1	5
Improving English grammar	M	28	2.93	3	1.052	1	5
Improving English grammar	F	36	3.33	3	1.069	1	5
Improving vocabulary knowledge	M	28	3.54	4	1.105	1	5
Improving vocabulary knowledge	F	36	3.69	4	0.98	1	5
Improving reading skills in English	M	28	3.39	3	1.197	1	5
Improving reading skills in English	F	36	3.39	3	1.05	1	5

Improving speaking skills in English	M	28	3	3	1.333	1	5
Improving speaking skills in English	F	36	3.39	3.5	1.128	1	5
Checking the use of English words in sentences	M	28	3.14	3	1.297	1	5
Checking the use of English words in sentences	F	36	3.5	3	1.028	1	5
Checking synonyms for English words	M	28	3.29	3	1.213	1	5
Checking synonyms for English words	F	36	3.39	3.5	1.225	1	5
Checking the meaning of unknown English words	M	28	3.61	4	1.197	1	5
Checking the meaning of unknown English words	F	36	3.64	4	1.175	1	5

Table 13

Phone Features Being Used with Time Duration Based on Country Variable

Which country are you from?	Phone features being used	*N*	Mean	Std. Deviation	Minimum	Maximum
P. R. China	Text messaging	10	2.1	0.738	1	3
	Talking	10	3.1	1.287	1	5
	Facetime/Video chat	10	2	1.054	1	4
	Reading email	10	2.9	1.37	2	6
	Writing email	10	2.8	1.476	1	6
	Using a dictionary	10	3	1.414	1	6
	Searching on the Internet	10	3.2	1.476	1	6
	Reading books/news	10	2.9	1.197	1	5
	Listening to music	10	3.4	1.713	1	6
	Playing games	10	2.7	1.829	1	6
	Watching videos	10	2.7	1.418	1	6

	Social network (Facebook, Twitter, Instagram, Wechat, etc)	10	3.1	1.792	1	6
	Using an English learning application	10	2.6	1.174	1	5
	Other (specify)	10	1.9	1.197	1	4
Japan	Text Messaging	8	3.13	0.991	2	5
	Talking	8	2.88	1.126	2	5
	Facetime/Video chat	8	1.5	0.926	1	3
	Reading email	8	2.13	0.354	2	3
	Writing email	8	2.13	0.354	2	3
	Using a dictionary	8	2.63	0.916	1	4
	Searching on the Internet	8	3.25	0.886	2	5
Japan cont.	Reading books/news	8	2.25	1.035	1	4
	Listening to music	8	4.13	1.356	2	6
	Playing games	8	1.63	0.916	1	3
	Watching videos	8	2.88	1.808	1	6
	Social network (Facebook, Twitter, Instagram, Wechat, etc.)	8	3.5	1.195	2	5
	Using an English learning application	8	2.6	0.535	2	3
	Other (specify)	8	1.63	0.916	1	3
South Korea	Text Messaging	5	2	0.707	1	3
	Talking	5	2.6	0.894	2	4
	Facetime/Video chat	5	1.6	0.894	1	3
	Reading email	5	2	0	2	2
	Writing email	5	1.8	0.447	1	2
	Using a dictionary	5	2	0	2	2
	Searching on the Internet	5	2.8	0.447	2	3

	Reading books/news	5	2	0.707	1	3
	Listening to music	5	2.8	0.447	2	3
	Playing games	5	1	0	1	1
	Watching videos	5	2.6	1.14	1	4
	Social network (Facebook, Twitter, Instagram, Wechat, etc.)	5	2.6	1.14	1	4
	Using an English learning application	5	2	1	1	3
	Other (specify)	5	1	0	1	1
Saudi Arabia	Text messaging	18	2.78	1.309	1	6
	Talking	18	3.11	1.367	2	6
	Facetime/video chat	18	2.89	1.605	1	6
	Reading email	18	2.33	0.594	1	3
	Writing email	18	2.11	0.758	1	4
	Using a dictionary	18	3.06	1.305	2	6
	Searching on the Internet	18	3.72	1.565	1	6
	Reading books/news	18	2.44	0.984	1	5
	Listening to music	18	2.94	1.349	1	5
	Playing games	18	2.44	1.464	1	6
	Watching videos	18	3.61	1.092	2	5
	Social network (Facebook, Twitter, Instagram, Wechat, etc.)	18	4.17	1.425	2	6
	Using an English learning application	18	2.72	1.227	1	6
	Other (specify)	18	2.33	1.97	1	6

Table 14

Use of Mobile Technology for English Skill Building Activities Out of Class Based on Country Variable

Which country are you from?	Phone Features Being Used	*N*	Mean	Std. Deviation
P. R. China	Checking the pronunciation of unfamiliar or difficult word	10	3	1.054
	Checking the meaning of unfamiliar English words definitions	10	3.1	0.994
	Looking for synonyms of English words	10	2.8	0.919
	Finding example sentences of English words	10	3.1	0.738
	English grammar exercises	10	3.2	0.632
	Vocabulary exercises	10	3.7	0.483
	Listening to English	10	3.3	0.675
	Speaking in English	10	3.4	0.699
	Writing in English	10	3.2	0.632
	Reading in English	10	3.5	0.527
Japan	Checking the pronunciation of unfamiliar or difficult word	8	3.38	1.188
	Checking the meaning of unfamiliar English words definitions	8	3.88	0.835
	Looking for synonyms of English words	8	3.5	1.069
	Finding example sentences of English words	8	3.25	1.165
	English grammar exercises	8	2.63	1.061
	Vocabulary exercises	8	3	0.926
	Listening to English	8	3.38	0.744
	Speaking in English	8	2.38	1.188
	Writing in English	8	2.5	1.069
	Reading in English	8	2.88	0.835

South Korea	Checking the pronunciation of unfamiliar or difficult word	5	3	0.707
	Checking the meaning of unfamiliar English words definitions	5	4	0.707
	Looking for synonyms of English words	5	3.8	1.095
	Finding example sentences of English words	5	3.6	0.894
	English grammar exercises	5	3.2	0.837
	Vocabulary exercises	5	2.6	1.14
	Listening to English	5	3.4	0.548
	Speaking in English	5	2.4	0.894
	Writing in English	5	3	1
	Reading in English	5	3	0.707
Saudi Arabia	Checking the pronunciation of unfamiliar or difficult word	18	2.72	1.018
	Checking the meaning of unfamiliar English words definitions	18	3.44	0.856
	Looking for synonyms of English words	18	3.17	0.985
	Finding example sentences of English words	18	2.67	1.237
	English grammar exercises	18	2.61	1.145
	Vocabulary exercises	18	3.17	1.15
	Listening to English	18	3.5	0.857
	Speaking in English	18	3.17	1.15
	Writing in English	18	3.39	1.037
	Reading in English	18	3.44	0.784

Table 15

Perceptions of Potential Benefits in Class Based on Country Variable

Which country are you from?	Phone Features Being Used	*N*	Mean	Std. Deviation
P. R. China	Improving pronunciation in English	10	3.3	1.337
	Improving writing in English	10	3.4	1.075
	Improving listening skills in English	10	3.5	1.08
	Improving English grammar	10	3.4	1.075
	Improving vocabulary knowledge	10	3.3	1.16
	Improving reading skills in English	10	3.4	1.075
	Improving speaking skills in English	10	3.3	1.16
	Checking the use of English words in sentences	10	3.5	1.08
	Checking synonyms for English words	10	3.3	1.16
	Checking the meaning of unknown English words	10	3.5	1.08
Japan	Improving pronunciation in English	8	2.88	1.126
	Improving writing in English	8	2.75	1.165
	Improving listening skills in English	8	3.38	0.916
	Improving English grammar	8	2.75	1.035
	Improving vocabulary knowledge	8	3.5	0.756
	Improving reading skills in English	8	3.13	0.835
	Improving speaking skills in English	8	2.5	0.926
	Checking the use of English words in sentences	8	3.38	0.744
	Checking synonyms for English words	8	3.38	0.744
	Checking the meaning of unknown English words	8	3.13	0.835

South Korea	Improving pronunciation in English	5	3	0.707
	Improving writing in English	5	3.2	0.837
	Improving listening skills in English	5	3.4	0.548
	Improving English grammar	5	3.4	0.548
	Improving vocabulary knowledge	5	4	1
	Improving reading skills in English	5	3.2	1.483
	Improving speaking skills in English	5	3.6	1.14
	Checking the use of English words in sentences	5	3.6	1.14
	Checking synonyms for English words	5	3.4	0.894
	Checking the meaning of unknown English words	5	3.8	0.447
Saudi Arabia	Improving pronunciation in English	18	3.33	1.237
	Improving writing in English	18	3.33	1.085
	Improving listening skills in English	18	3.61	1.092
	Improving English grammar	18	3.17	1.043
	Improving vocabulary knowledge	18	3.94	0.873
	Improving reading skills in English	18	3.39	1.037
	Improving speaking skills in English	18	3.22	1.215
	Checking the use of English words in sentences	18	3	1.138
	Checking synonyms for English words	18	3.11	1.41
	Checking the meaning of unknown English words	18	3.89	1.132

Goal of the Research

This study focused on the knowledge of ESL learning with smartphone technologies from students' perspectives. Specifically, the current research study was to learn what ESL students' preferences and habits were with their mobile phones and to find out what students did outside of class on their phone to help with English skills building. In addition to that, students' perceptions regarding using smartphone technologies for the purpose of English learning in class were also examined. For the research goal, the independent variables in this study were purposes that students used smartphones for English learning outside of classes versus students' perceptions on the same purposes of using smartphone in the class.

A survey instrument, described in Chapter 3, was used to collect quantitative data. Descriptive and inferential statistics were used to analyze the data after data collection. Results from the analysis were presented in Chapter 4 based on the sequential order of research questions.

Summary of the Findings

To give an overall report of the findings, each research question is stated again with a summarized result. Research Question 1: In which specific mobile phone activities did students do in English and for how much time each day? According to the six different time durations including 0 minute, more than 0 but less than 30 minutes, more than 30 but less than 90 minutes, more than 90 but less than 180 minutes, more than 180 minutes (3 hours) and more than 300 minutes (5 hours), more selections fall into category more than 0 but less than 30 minutes, more than 30 but less than 90 minutes and more than 90 but less than 180 minutes; Among the 14 listed mobile phone features, the highest percentage rate fell into the category more than 0 but

less than 30 minutes and the percentage rate from high to low was reading email (70%), writing email (69%), reading books/news (48%), using a dictionary (45%), talking (44%), texting (42%), video chat (36%), using an English learning applications (33%), playing games (27%), watching videos (27%), listening to music (23%), searching on the Internet (23%), social network (20%) and others (19%). Among the longer time duration column such as over 3 hours and over 5 hours, entertainment features such as listening to music, watching a video, social networks and searching on the Internet had the higher percentage rate scored by the people who selected a longer time duration.

For Research Question 2: In which skill building activities did ESL students engage on smartphones for English learning out of class? Among the 10 English skills listed in the instrument survey, all the mean scores for each English skill were rated more than average and one mean score was rated high. This result indicates students use mobile phones for the purpose of listed English skills. The English skills scoring from high to low were: Checking the meaning of unfamiliar English words definitions (M = 3.61); listening to English (M = 3.34); reading in English (M = 3.28); looking for synonyms of English words (M = 3.22); vocabulary exercises (M = 3.11); writing in English (M = 3.06); speaking in English (M = 3.00); finding example sentences of English words (M = 2.97); checking the pronunciation of unfamiliar or difficult words (M = 2.95); and English grammar exercises (M = 2.80).

For Research Question 3: What benefits did the ESL students perceive that they might gain by using smartphones to learn English in the classroom? This is a question to ask what English learners think about using smartphones in class for the same English skills listed for Research Question 2. All the scores for this question were rated more than average and two scores were rated high. The English skills scored from high to low were: Checking meanings of

unknown words (*M* = 3.63); improving vocabulary (*M* = 3.63); improving listening in English (*M* = 3.48); improving reading in English (*M* = 3.39); checking the use of English words in sentences and checking synonyms for English words (*M* = 3.34); improving writing in English (*M* = 3.27); improving speaking skills in English (*M* = 3.22); improving pronunciation (*M* = 3.17) and improving English grammar (*M* = 3.16).

The last question was to make a comparison of the mean scores between Research Question 2 and 3. Research Question 4: To what extent were students' perceptions of using mobile phones for each English skill item in class different from students' actual behaviors on mobile phones for each English skill building out of class? The scores were listed together in Table 16 to compare the mean difference between the two different variables – out of class versus in class.

Table 16

Mean Differences Comparison

	Out of Class	In Class
Check the meaning of unfamiliar English Words Definitions	3.61	3.63
Listening to English	3.34	3.48
Reading in English	3.28	3.39
looking for synonyms of English words	3.22	3.34
Vocabulary exercises	3.11	3.63
Writing in English	3.06	3.27
Speaking in English	3.00	3.22
Finding example sentences of English words	2.97	3.34
Checking the pronunciation of unfamiliar or difficult words	2.95	3.17
English grammar exercises	2.80	3.16

Comparison

Table 16 presents the means of the out of class English language learning activities along with the corresponding means of the items of in class variable. As one can see, the means of out of class variables are in a numerical order while most of the means of in class variable are in numerical order except for the two means: "vocabulary exercises" and "finding example sentences of English words." Among the in class variables, the means of “vocabulary exercises” and “checking the meaning of unfamiliar English words definitions” are actually the highest mean scores in either category. The variable “finding example sentences of English words” also has the same mean score as the variable “looking for synonyms of English words” and the two variables both tied for the fourth highest mean score. “Vocabulary exercises” and “finding example sentences of English words” also have a significant difference between out of class variable and in class variable. This might suggest the potential use of mobile phone technologies for vocabulary learning and finding example sentences of English words in class since students have not used their smartphone devices for these two skills out of class to the certain extent that they believe they could benefit from using smartphone in class for these two English skills. Also the mean scores of each item for in class English learning activities are all slightly higher than the corresponding means of the items for out of class English activities. For example, the mean of checking meanings of unknown words is rated 3.63 for in class but 3.61 for out of class; improving reading in English in class is rated 3.39 versus 3.28 for reading in English out of class. To reemphasize, the mean scores for the out of class variables represent the activities that students did out of class to build English skills; the mean scores for the in class variables represent the same English skills that students believe they will gain by doing the same activities on the mobile phone in class. In other words, the data show that students believe what they could

do on their mobile phone in class could benefit them for the same English purposes more than what they are doing out of class. According to the technology acceptance model (TAM) (Davis, 1989), the supportive relationship between actual use of the computer system and users' behavioral intentions to use was assumed. Furthermore, users' behavioral intentions to use were supported by users' attitudes toward using and users' attitude of using was determined by the perceived usefulness and perceived ease of use. The two beliefs of perceived ease of use and perceived usefulness were evidenced by the medium to high ranking of the mean scores. This implied that ESL students have better attitudes toward using the mobile phones for ESL learning in class, which matches the users' actual use of the technology out of class as well.

In the previous replicated research study (Mthethwa, 2014), however, reading English (*M* = 4.11), writing English (*M* = 3.93) and vocabulary learning (*M* = 3.37) were the three top ranked items for using mobile phones out of class; for the potential benefits of using the mobile phone in class, checking meanings of unfamiliar words (*M* = 4.30), improving vocabulary (*M* = 4.21) and checking example sentences (*M* = 4.12) were the three top ranked items. In this study, checking the meaning of unfamiliar words (*M* = 3.61), listening to English (*M* = 3.34) and reading in English (*M* = 3.28) are the three top ranked items based on the mean scores of out of class variables, but for in class variables, checking the meaning of unfamiliar words (*M* = 3.63) and vocabulary exercises (*M* = 3.63) together were rated the top items with the same mean score; listening to English (*M* = 3.48) and reading in English (*M* = 3.39) were the next two top ranked items in the list.

In the previous study (Mthethwa, 2014), significant differences were found between seven pairs of the items which were pronunciation, checking the meaning of unfamiliar English words, checking synonyms, finding example sentences, grammar exercise, vocabulary exercises,

and listening to English. In this current study, however, significant differences were found only between three pairs which were vocabulary exercise, grammar exercise and finding example sentences for English words. Several reasons could explain the two different findings. There were 82 participants from the previous study versus 64 participants of the current study. The previous study was conducted in a high school located in the southern part of Swaziland and the current study was conducted in a university located in the southern part of U.S. The participants in the previous study were from a single school of a single country, and the participants from this current study were international students from different countries. Another reason for the difference of this research from the previous study could be that the students in this research are in a U.S. school setting where there are more native speakers and media broadcasting, which gives students more chance to listen to English and read in English. But for the study in Swaziland, the researcher noted that internet on the students cell phone sometimes is very low. The top ranked items, such as checking the meaning of unfamiliar words and vocabulary exercises were both related to English words. These items are important because vocabulary is the basic foundation of another language (Alemi, Sarab, & Lari, 2012). As is experienced, little children learn their first language from babbling words.

Overall, from the results of all the four research questions, the participating ESL students used smartphone technologies for the certain English skills listed in the survey. The participants perceived the benefits of mobile technologies to be used in class for the same English skills. The students used certain mobile phone features in English on a daily basis. Different from current existing literatures focusing on using a certain mobile phone function or application to improve the outcome of students' English performance, this study examined ESL students' experiences with mobile devices outside of classroom and their perceptions of using smartphone technologies

in class for the benefit of English skills. The results reported ESL students used mobile phones for English activities such as reading, writing emails, reading books, searching a dictionary and talk and text on a daily basis with their own time. Future study could be focused on using mobile phones for vocabulary exercise and check the meaning of unfamiliar English words since these two items had highest mean scores for in class variable. Future studies could also be focused on the relationship between the non-formal use of certain phone features and specific English skills. For example, using a dictionary application might help ESL learners check the meaning of unfamiliar English words; using a vocabulary exercise application in class might motivate students to remember more vocabularies with a longer retention time.

Limitations of the Study

One limitation of this study was that the sample size of 64 participants was small for survey studies. The institute had a total of 149 students from level 1 to level 6 registered in the Fall II term of 2016 since the institute had a decrease of the number of enrolled students during the fall semester. Among the 149 students, 25 students from the three classes of level 1, 2 & 6 (one class for each level) were accessible to take the survey in the lab classes and 39 students from level 3, 4 & 5 classes (total of 109) were also randomly recruited in the hallway of the institute building. The sample was recruited only from one language institute in one U.S. University located in a large southern state of the United States with roughly 37,000 student body and 2,500 of them are international students. The results might not be generalized to all the ESL learners on a larger scale. Furthermore, the sample size was inferred based on the medium to large effect size from the previous study; however, the Cohen's effect sizes calculated in the study turned out to be fairly small. Therefore, for a small effect size with 0.80 power, a sample

size of 90 participants is ideal calculated by the G*Power tool. Therefore, the 64 participants in this study are less than the ideal sample size number and a larger sample size with more participants is recommended for future study. To find out more specific norms for all the ESL students to use mobile phone technologies to learn English as a second language, a replicated study to test these results in one or more other similar school settings could be used. Another limitation of this study is the answers of the research questions were provided by students as self-report which means participants answer questions directly through the instrument (Colton & Covert, 2007). Participants answered those questions based on their own understanding and honesty toward the questions asked and there is no test to prove participants' answers are true or false.

Secondly, the independent variables were not controlled by me. This study only focused on some of students' behaviors on their smartphones and their perceptions about using smartphones for ESL learning. However, Firmin, Hwang and Wood (2007) suggested that belief alone is not sufficient to reach a certain result even if there is strong belief. To form a direct one to one relationship between attitudes and behavior, Fazio and Zanna (1981) narrowed down to certain attitudes among a certain type of individual to predict certain behavior. That allows the potential strength of the relationship to vary. Therefore, other psychological variables such as students' motivation, self-efficacy, personality, education background, etc. could be aligned for future study to analyze and assure the efficiency of using smartphones for acquiring ESL skills. The demographic information such as gender, English level, major, educational background collected in this study could also to be used for this purpose. Therefore, other qualitative research methods such as interviews or focus group discussions could be used in the future to gather feedbacks from students and examine these psychological variables.

Lastly, responses for only 20 items were collected from a previous survey to do the paired sample *t*-test which might not include some other aspects or factors relative to this course subject such as prerequisite skills of English subject, both students' and teachers' technology literacy. However, this study investigated smartphone features that students used out of the class and the time duration of use. The data result may be used to learn if there are any correlations between the aspects of using certain smartphone features and certain ESL skills for both out of class and in class settings.

Conclusion

This study is a replicated study and adapted part of the survey items from a previous dissertation research conducted in the southern part of Swaziland. The previous study investigated students' uses of smartphones out of class for English language learning in Swaziland and their beliefs about the benefits of using smartphones in class for learning English (Mthethwa, 2014). In addition to investigating the same variables, to further the previous research the current study added smartphone applications that students could use outside of class for how much time being used for each phone application.

Literature was collected in various subjects including second language acquisition and learning, specifically CALL and MALL literature. Previous records and reports show that smartphone technologies have positive usefulness towards students learning as mentioned in Chapter 2. This study listed a wide range of literature focused on learning English as a second language using mobile phone technologies. Mobile assisted language learning, ESL, and the ESL learner was the main focus of the literature collected and studied. Past literature focused on content, technology and traditional teacher-centered teaching method, but mobile learning tends

to emphasize mobile technology assisted individualized learning style (Uther & Banks, 2016; Uther, Zipitria, Uther & Singh, 2005a).

This study, however, analyzed how students used their mobile phone technologies for ESL learning. Besides answering the research questions, the survey also collected some demographic information of the participants such as age, gender, major, educational level, English level and phone devices that participants use. These data could be used for future studies to find out the smartphone usage from individual learners with different backgrounds. For example, based on the gender differences, among the 28 male students and 36 female students participating in this study, more male students than female students use all of the phone features for over five hours a day except two activities, talking and writing email, and female students had a longer time duration of using these two features. More female students selected “usually” but more male students selected “sometimes” for each English skill building activity using phone devices. For their perceptions about using smartphones for the same English skills in class, the rating is similar between the male and female group except for three items, pronunciation, speaking and writing, where the male students selected a slightly lower rating. To illustrate, most male students selected “slightly beneficial” while most females selected “quite beneficial” about the smartphone’s potential benefit for pronunciation. For the item “speaking,” most male students selected “slightly beneficial” when most female students selected “moderately beneficial” which was one level higher than “slightly beneficial,” for the other item about “writing,” most male students selected “moderately beneficial” while most of the females option was “quite beneficial” which is also one level higher than “moderately beneficial.” This data is also consistent to their actual use, where more females spent more time talking and writing than male students did and possibly paid more attention to pronunciation.

According to the different nationality of the participants, the data were grouped by four major countries including Saudi Arabia, China, Japan and South Korea. South Korean students did not use many mobile phone features with a longer time duration for entertainment. However, South Korean students scored high for both using mobile phone technologies for English purposes outside of class and their perceptions about the benefit of using mobile phones in class for the same English purposes. On the other hand, Japanese students scored low for the items of out of class and in class variables based on the English purposes. Japanese students also didn't spend much time using the mobile phone features listed. Students from China and Saudi Arabia did spend more time using their phone devices, but their activities for English purposes and beliefs on using the devices in class for English purposes were slightly lower than their South Korean classmates.

The second part of the instrument included a validated survey to understand students' use of mobile phones for the purpose of ESL learning outside of the class, including their perceptions about using mobile technologies in class for the same purpose of ESL. Results revealed that ESL students used their mobile phones for the purpose of English learning outside of class. Students also perceived potential benefits of using mobile devices for English learning in class. This may imply positive attitudes toward the benefits they could gain by using mobile phones in class based on belief-attitude-intention behavior relationship (Fishbein & Ajzen, 1997). Students believed this specific technology could help them study English in class better than using their mobile devices outside of class for ESL learning. The features most people used every day for a short amount of time were reading and writing emails. Reading books, using a dictionary, talking and texting were ranked next to each other on the list. Social networking, listening to music and searching on the Internet were the three top ranked items on the list of people using them for

more than three hours per day. Also a bigger proportion of the participants watched videos and used a dictionary for more than an hour and half per day. In the paired sample *t*-test, three paired items showed significant differences between ESL skills built on smartphone technologies out of class and students' perceptions of the benefits of using smartphone technology for ESL in class. The three items are vocabulary exercise, example sentences of English words and English grammar exercise. Different from the previous study conducted in Swaziland, except two items (vocabulary exercise and finding example sentences of English words), all the other items listed in Part 2 and Part 3 of the survey (Appendix A) were ranked the same in a sequential order from high to low between the group of out of class variable and the group of in class variable, which means the items on the survey were in a preferable order based on the importance of each item. In the previous study, no item listed for the out of class variable had the same ranking as the corresponding item listed for the in class variable. The result of this study showed the data was more consistent between students' behaviors regarding the actual use of smartphones for English skills and students' beliefs, which could be the prediction of continued use of the technology for the same purposes.

In conclusion, this study revealed that ESL students engaged in English related activities on their mobile phones for different time durations every day. The ESL students experienced use of the features on their devices for English skill building activities outside of class. Students also perceived benefits of using smartphones for the purpose of building same English skills in class. Vocabulary exercises could be considered the first practice to be assisted with the integration of smartphone technologies in the classroom in this specific case. For future study, more analysis about how students use social networks, dictionaries, or other smartphone applications could be conducted, specifically on how to integrate smartphones using applications for social networks,

dictionaries or the Internet as educational tools for second language acquisition. The data could also be examined based on students' different levels of English proficiency, their educational background, major or time in the U.S. for additional insights into what might be helpful for second language acquisition.

APPENDIX A

QUESTIONNAIRE

PART ONE: Demographic Information

1. What is your age? _____

2. What is your gender?

- ❍ Male
- ❍ Female

3. Which country are you from?

- ❍ P.R. China
- ❍ Japan
- ❍ South Korea
- ❍ Saudi Arabia
- ❍ Mexico
- ❍ Other _____

4. How long have you been in the U.S.?

- ❍ less than 6 months
- ❍ 6 months to 1 year
- ❍ more than 1 year

5. What is your IELI class level?

- ❍ level 0
- ❍ level 1
- ❍ level 2
- ❍ level 3
- ❍ level 4
- ❍ level 5
- ❍ level 6

6. What will be your grade level after graduating from IELI?

- ❍ Freshmen
- ❍ Sophomore
- ❍ Junior
- ❍ Senior
- ❍ Graduate
- ❍ Not a student

7. If you are a student, what do you plan to study after finishing IELI?

- ❍ Business
- ❍ Engineering
- ❍ Computer Science
- ❍ Science
- ❍ Not applicable
- ❍ Other _____

8. Do you have a mobile phone or a smartphone?

- ❍ Regular Mobile phone - (e.g. dial numbers/text, flip phone)
- ❍ Smartphone (e.g. iPhone, Samsung phone or phone with Wifi, Internet, photo, video, audio, message/voice message)

9. What operating system does your phone use?

- ❍ iOS
- ❍ Android
- ❍ Windows
- ❍ Other _____

10. How many minutes do you spend per day on each of the following activities in English?

	0	more than 0 but less than 30 minutes	more than 30 but less than 90 minutes	more than 90 but less than 180 minutes	more than 180 minutes (3 hrs)	more than 300 minutes (5 hrs)
Text messaging	❍	❍	❍	❍	❍	❍
Talking	❍	❍	❍	❍	❍	❍
Facetime/ video chat	❍	❍	❍	❍	❍	❍
Reading email	❍	❍	❍	❍	❍	❍
Writing email	❍	❍	❍	❍	❍	❍
Using a dictionary	❍	❍	❍	❍	❍	❍
Searching on the Internet	❍	❍	❍	❍	❍	❍
Reading books/news	❍	❍	❍	❍	❍	❍
Listening to music	❍	❍	❍	❍	❍	❍
Playing games	❍	❍	❍	❍	❍	❍
Watching videos	❍	❍	❍	❍	❍	❍
Social network (Facebook, Twitter, Instagram, Wechat, etc.)	❍	❍	❍	❍	❍	❍
Using an English learning application	❍	❍	❍	❍	❍	❍
Other(Specify)	❍	❍	❍	❍	❍	❍

PART TWO

11. How often do you use smartphones for the following English language skill building activities?

	Never	Rarely	Sometimes	Usually	Most of the time
Checking the pronunciation of unfamiliar or difficult word	❍	❍	❍	❍	❍
Checking the meaning of unfamiliar English words definitions	❍	❍	❍	❍	❍
Looking for synonyms of English words	❍	❍	❍	❍	❍
Finding example sentences of English words	❍	❍	❍	❍	❍
English grammar exercises	❍	❍	❍	❍	❍
Vocabulary exercises	❍	❍	❍	❍	❍
Listening to English	❍	❍	❍	❍	❍
Speaking in English	❍	❍	❍	❍	❍
Writing in English	❍	❍	❍	❍	❍
Reading in English	❍	❍	❍	❍	❍

PART THREE

12. For which of the following purposes do you think using smartphones in class for learning English could be beneficial?

	Not beneficial	Slightly beneficial	Moderately beneficial	Quite beneficial	Very beneficial
Improving pronunciation in English	❍	❍	❍	❍	❍
Improving writing in English	❍	❍	❍	❍	❍
Improving listening skills in English	❍	❍	❍	❍	❍
Improving English grammar	❍	❍	❍	❍	❍
Improving vocabulary knowledge	❍	❍	❍	❍	❍
Improving reading skills in English	❍	❍	❍	❍	❍
Improving speaking skills in English	❍	❍	❍	❍	❍
Checking the use of English words in sentences	❍	❍	❍	❍	❍
Checking synonyms for English words	❍	❍	❍	❍	❍
Checking the meaning of unknown English words	❍	❍	❍	❍	❍

Note: Adapted from Mthethwa (2014). The Utility of Mobile-assisted Language Learning (MALL): ESL students' beliefs about new literacy in Swaziland.

APPENDIX B

PERMISSION LETTER

Subject:	Re: Seeking permission to use survey instrument
From:	[redacted]
To:	[redacted]
Date:	Wednesday, April 22, 2015 6:31 AM

Dear Shelly,

Following your request to use the instrument I used for my dissertation, I hereby grant you permission to use the instrument. The condition for which this permission is granted is that you use it only for the purpose for which you stated i.e. writing of your dissertation.

I wish you all the best in your study.

Patrick M. Mthethwa, Ph.D
Fulbright Scholar & Researcher
Senior Lecturer : English
Ngwane Teachers' College
Office: (268) 22078466/7; Ext 206
Cell: (268) 76052992.
****

APPENDIX C

IRB APPROVAL

UNT

Research and Economic Development
The Office of Research Integrity and Compliance

July 14, 2016

Dr. Cathleen Norris
Student Investigator: Shanyuan Zhu
Department of Learning Technologies
University of North Texas

RE: Human Subjects Application No. 16-297

Dear Dr. Norris:

In accordance with 45 CFR Part 46 Section 46.101, your study titled "Utilizing Mobile Technologies for US International Students' English Learning as a Second Language" has been determined to qualify for an exemption from further review by the UNT Institutional Review Board (IRB).

Enclosed are the consent documents with stamped IRB approval. Please copy and **use this form only** for your study subjects.

No changes may be made to your study's procedures or forms without prior written approval from the UNT IRB. Please contact The Office of Research Integrity and Compliance at 940-565-4643, if you wish to make any such changes. Any changes to your procedures or forms after 3 years will require completion of a new IRB application.

We wish you success with your study.

Sincerely,

Chad Trulson, Ph.D.
Professor
Chair, Institutional Review Board

CT:JM

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