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ESL teacher, student, and parent perceptions about barriers and criteria for using educational mobile applications to develop the language skills of ESL elementary school students

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Abstract
The purpose of this qualitative study is to explore the criteria used by teachers, students, and parents to choose suitable and effective applications for ESL instruction, as well as the barriers that teachers, students, and parents perceive might influence the successful use of such applications to improve ESL elementary school students' language skills. Qualitative data were collected through in-depth interviews from eight ESL students and eight ESL parents from Unity Point and from eight ESL teachers from different schools in Carbondale.

Participants identified some obstacles to their effective use, including a general lack of mobile devices and effective applications, a lack of technical support, inadequate professional development, and negative attitudes. In addition, participants identified some criteria for choosing applications. These criteria were organized under four main themes: user feedback and reputation, content and focus, theoretical and pedagogical features, and technological features.

This study provides some recommendations for the successful integration of technology in English learning and teaching for overcoming the obstacles that ESL teachers, students, and parents might encounter. Furthermore, identifying the criteria for choosing educational mobile applications could provide a framework for evaluating them, especially those used for learning English. These criteria could be used to help teachers choose appropriate applications to improve their teaching practices and performance and help decision makers assess applications and reflect upon their educational value. They may also be used to inform the design of these applications in a way that supports the effective integration of mobile technology in ESL learning and teaching.

Keywords: ESL, teacher, student, parent perceptions

Introduction

Many studies have investigated the impact of integrating digital technology (e.g., computers, tablets, digital cameras, smart phones, and iPads) on the learning and teaching process. According to Zydney and Warner (2016), digital technology offers an interactive and engaging learning environment in which the learner is an active participant rather than a passive receiver of knowledge. It also helps learners enhance their ability to organize their own learning and improve their time management skills (Tabuenca, Kalz, Drachsler, & Specht, 2015) [65]. On the other hand, digital technology has some drawbacks that may hinder the learning and teaching process (Kukulska-Hulme & Shield, 2007) [30]. In addition to the high cost and lack of technical support, the lack of expertise in technology among some teachers and learners may hinder the educational process and cause it to become more time consuming. This lack of expertise may also interrupt teaching and distract students, particularly when they are connected to the Internet (Al Aamri, 2011) [1].

Various empirical studies have proposed a connection between mobile learning and second language learning in the areas of writing (Silver & Repa, 1993) [59], speaking (Peterson, 1990) [50], listening comprehension (Grezel & Sciarone, 1994), grammar (Swann, 1992) [64], and vocabulary (Kang, 1995) [25]. Mobile learning and ESL language instruction are associated because mobile learning makes ESL material more accessible to ESL learners. Meskill and Mossop (2000) [38] stated that ESL learners have a greater opportunity to participate in the daily instructional activities by using mobile learning. When ESL teachers work with students who have different levels of English-language ability, mobile learning offers more tasks and materials that support individual learning needs.

Numerous studies in education indicate that technology use can improve students' critical thinking (CEO Forum on Education and Technology, 2001) and increase students' motivation (Sivin-Kachala & Bialo, 2000) [60]. In addition to increasing motivation, ESL teachers like using mobile learning because it promotes student-student interaction with teacher support. According to Meskill and Mossop (2000) [38], there are two groups of ESL teachers. One group considers mobile learning as separate from regular classroom activity. This means that mobile learning is used mainly to pursue skills. The second group uses mobile learning creatively to promote cognitive development among students. Typically, these teachers consider mobile learning as a means of helping students comprehend language concepts and content.

In Meskill and Mossop's (2000) [38] study on elementary students, ESL teachers tended to utilize basic language skills

to improve understanding, vocabulary, and spelling and believed that students took more time in a dynamic classroom that makes use of digital technology than they would in a regular class. For two decades now, the education sector has utilized technology devices to complement the teaching and learning process. Furthermore, Hew and Brush's (2007) [20] study revealed that the belief that technology can influence the teaching and learning process has caused many governments to create programs that integrate technology in their schools. For example, in Singapore, the Information Technology in Education plan has cost approximately $1.2 billion to integrate technology in their education system and develop students' critical thinking, facilitate the learning process, and increase social development. In the United States, $7.87 billion was spent on technology instruments during the 2003–2004 school year (Quality Education Data, 2004) [51].

Research Purpose and Questions

The purpose of this qualitative study is to explore the criteria used by ESL teachers, students, and parents for choosing suitable and effective educational mobile applications for ESL instruction and the barriers that ESL teachers, students, and parents perceive might influence the successful use of educational mobile applications to improve ESL elementary school students' language skills. This study collected qualitative data. I gathered qualitative data through semi-structured interviews with ESL students, parents, and teachers in order to explain the quantitative data gathered in the first phase and to fully explore their perceptions of using educational mobile applications to improve their language skills.

This study is significant because it contributes to the body of research on using mobile learning in ESL instruction, which is still an emerging field (Şad & Göktaş, 2014) [54]. It could also raise awareness among ESL teachers, students, parents, and curriculum designers regarding mobile devices and applications as an education tool that can be used to help ESL students in mainstream English classrooms (see Ozdamli & Uzunboylu, 2015) [46]. Additionally, ESL teachers' and students' beliefs about integrating technology in the ESL classroom could provide a better understanding of their actual practices (Merç, 2015) [37]. Gathering quantitative data and qualitative data, using multiple data sources, and involving different perspectives could provide a fuller understanding of using mobile applications to improve ESL students' language skills (see Creswell, 2014) [9], as well as reveal the discrepancies between teacher, student, and parent perceptions (see Lyle, 2010). Furthermore, the qualitative analysis of ESL applications reveals some of their strengths and weaknesses and reflects their educational and pedagogical values. Thus, the present study could serve as a guide for application designers as well as for ESL learners, teachers, and curriculum designers when looking for the most suitable and effective applications to improve ESL skills (see Kim & Kwon, 2012) [27]. Lastly, this study could serve to encourage school administrators and decision makers to review their policies on using mobile devices in educational institutions (Şad & Göktaş, 2014) [54].

Research Questions

The following questions guided this study

1. What are the barriers that ESL teachers, students, and parents perceive might influence the successful use of mobile applications to improve ESL elementary school students' language skills?
2. What criteria do ESL teachers, students, and parents use to choose suitable and effective mobile applications for ESL instruction?

The questions are also relevant to the research problem because choosing appropriate materials for ESL classrooms plays a significant role in shaping students' and teachers' beliefs and attitudes (Brown, 2007).

Significance of the Problem

Mobile learning is still an emerging field and more research is required to more fully understand its nature (Vázquez-Cano, 2012; Traxler, 2007; Şad & Göktaş, 2014) [54]. This study contributes to the body of research in this field and the knowledge about teaching and learning English as a second language. Additionally, ESL teacher, parent, and student beliefs about mobile learning might provide a better understanding of their actual practices inside and outside the classroom (see Merç, 2015) [37]. Furthermore, this study could raise awareness among ESL teachers, students, parents, and curriculum designers regarding mobile devices and applications as an education tool (see Ozdamli & Uzunboylu, 2015) [46]. Thus, the present study could serve as a guide for application designers as well as for learners, teachers, and curriculum designers when looking for the most suitable and effective applications (see Kim & Kwon, 2012) [27]. Lastly, this study could serve to encourage school administrators and decision makers to review their policies on using mobile devices in educational institutions (see Şad & Göktaş, 2014) [54].

Literature review

This section reviewed relevant literature on mobile learning; benefits, challenges, barriers to using mobile devices in the ESL classroom, and attitudes and motivations regarding mobile learning in English language learning

Benefits, Challenges, and Barriers to Using Mobile Devices in the Classroom

Mobile devices as educational tools have produced a new generation of educational resources for learners to discover, think, and explore anywhere and anytime (Goodwin, 2012) [16]. These educational tools consist of software application programs called apps developed specifically to run mobile devices. Preston and Mowbray (2008) studied the role of mobile devices in the classroom and found them to be highly beneficial in helping teachers and learners use innovative learning methods. In addition, mobile devices have a positive effect in developing English language learners' skills (Jung & Suhyun, 2012) [24].

Teachers have found that such apps can be extremely beneficial in addressing the interests and needs of English language learners. Each technological tool, such as mobile

devices, benefits speaking, listening, reading, and writing skills (Dalley-Hewer *et al*., 2012) [11]. To use apps successfully, English language learners and teachers should be familiar with mobile devices that make use of these apps. In other words, the teacher, the learner, and the technology used in class are all important to achieve advanced learning results (Sharma, 2009).

Using technology in the classroom not only increases motivation and self-confidence among English language learners, it also develops and promotes language skills. However, while technology is now increasingly necessary in the classroom, the teacher has to be mindful of the challenges it poses. de Lourdes Andrade (2014) [12] mentioned some challenges of technology use in classrooms, including technical difficulties (e.g., when a link on the website is broken) and broadband speed (e.g., when it is too low to access the Internet). Additionally, she mentioned how some teachers do not have sufficient knowledge to employ technology in their classroom and do not realize how technology can be used as an educational tool to enhance learning. Finally, the lack of experience with new technology among teachers is one of the biggest challenges to successful technology integration in classroom tasks.

In Lepi's study (2013), teachers and administrators identified the major challenges to integrating technology in the classroom as a lack of funds, time, professional teachers, teacher training courses, and technology infrastructure, as well as the increasing costs of maintaining technology infrastructure (as cited in Roblyer & Knezek, 2003, p. 2) [53].

The use of mobile learning (or mLearning) is steadily expanding in developing countries. This means that mobile learning in the field of education in particular has gone from short-term to large-scale integration (Valk, Rashid, & Elder, 2010) [67]. Mobile learning creates an excellent environment for learning and teaching and helps learners follow up on their studies according to their own schedule. In other words, mobile learning makes the learning environment available anytime and everywhere (Sharples, Taylor, & Vavoula, 2005) [56]. In addition, mobile learning expands the quality of education tools by reducing the cost and increasing the flexibility, efficiency, and effectiveness of educational policy (Valk *et al*., 2010) [67]. Mobile learning supports alternative educational and instructional processes that promote effective teaching and learning.

According to proponents of new learning, mobile learning supports teaching and learning processes that take place during daily activities, outside of the classroom, or outside of the educational environment (Sharples *et al*., 2005) [56]. In addition, it shifts from teacher-centered learning to learner-centered learning to help learners meet their own educational goals (Sharples, Taylor, & Vavoula, 2007). Moreover, mobile learning emphasizes using learners' educational knowledge to discover, think about, identify, and manipulate existing information (Brown, 2003). Valk *et al*. (2010) [67] found that technological issues, such as screen size, reveal a challenge to the success of mobile learning. Furthermore, language barriers can lessen the benefits of mobile learning patterns, and high costs remain a main factor hindering their use by the individual learner.

Hew and Brush (2007) [20] pointed out the 123 barriers faced by K-12 schools when integrating technology into the curriculum. These are classified into six main categories: (a) resources, including technology, access to available technology, time, and technical support; (b) knowledge and skills, including insufficient computers, peripherals, and software; (c) institution, including leadership, school time-tabling structure, and school planning; (d) attitudes and beliefs; (e) assessment, including pressure from testing, pressure to meet higher standards, and pressure to score high on standardized tests; and (f) subject culture, including the subject content, subject pedagogy, and subject.

Attitudes and motivations regarding mobile learning in ESL

At the beginning of the 21st century, rapid advances in technology were expected to change learner's attitudes. As an example, Nicholas and Ng (2009) [43] mentioned that pre-service teachers' attitudes about online learning were supported by educational devices, such as blogging and wikis. This finding is important because when teachers are familiar with technological ability, it positively influences their attitudes about technological integration in the classroom. Additionally, because teachers are the gateway for what occurs in the classroom environment, it is important to consider their attitudes. This means that the attitudes of students and teachers toward mobile learning can close the gap between using mobile devices inside and outside the classroom (Messinger, 2012) [39].

Mobile learning in the classroom can improve teachers' attitudes about the learning and teaching process because it helps them enhance or create new learning methods differ from the traditional methods. Mobile learning, as well as, plays a significant role in changing students' attitudes toward the teaching and learning process (Homan & Wood, 2003) [21].

Teachers' attitudes toward the use of mobile technology as an instructional device are rapidly improving. Teachers ultimately decide upon an instructional tool's effectiveness and are thus a gatekeeper to effective use of mobile learning in the educational system, and so it is therefore important to understand their attitudes toward mobile learning (Yüksel, & Kavanoz, 2011) [73]. According to Bullock, teachers' attitudes were an essential factor in the integration of technology because they affected the teachers' decisions about educational strategies and content (as cited in Huang & Liaw, 2005) [22]; furthermore, teachers' attitudes are a major predictor of the use of mobile learning in the educational system (Vannatta & Nancy, 2004) [68].

Motivation is an essential part of the educational process. Mobile learning devices stimulate learners' motivation to learn more than traditional learning (Messinger, 2012) [39]. Such devices are thus effective in language learning and teaching (Fallahkhair, Pemberton, & Griffiths, 2007) [14]. They improve the development of language skills (e.g., Chang & Hsu, 2011) [7] and language learning motivation (e.g., Huang, Huang, Huang, & Lin, 2012) and promote learners' co-construction of knowledge (Joseph & Uther, 2009).

Mobile learning increases language learners' motivation, generates positive attitudes toward the learning process (Rahimi & Hosseini, 2011) [52], and decreases learners' anxiety in the classroom (Rahimi & Yadollahi, 2011) [52].

Moreover, mobile learning can influence language learners' vocabulary (see Ogata, Yin, El-Bishouty, & Yano, 2010) [45], promote students' language learning motivation (Cooney & Keogh, 2007), and encourage peer-assisted language learning (Lan, Sung, & Chang, 2007). Different educational apps can be employed to improve learner reading ability. Such apps can also raise learner motivation to improve vocabulary and reading skills. Mobile devices can also increase the learner's interest in reading skills. Reading-based software programs can facilitate English language learner's interaction with texts and help address the individual needs of learners when reading (Ybarra & Green, 2003) [72].

Methodology

This section describes the qualitative design, the rationale for its selection, the sampling method, data collection procedures, and data analysis plan.

Research Methodology

A qualitative design was an appropriate approach to this research. According to Ivankova, Creswell, and Stick (2006) [23], qualitative method design helped researchers benefit from the strength of each and gained a better understanding of the research problem. According to Creswell (2014) [9], qualitative design was one of the most popular method designs. I used a case study design that involves the use of in-depth interviews. Additionally, the interview data supplemented helped explain and explore the factors that shaped these perceptions because this design gives participants an opportunity to reflect on their responses and to provide more details than those collected solely by quantitative methods (Mollaei & Riasati, 2013) [41].

Population and Sample

This study entirely took place in Carbondale, Illinois, in the academic year 2016/2017. There were six elementary schools in Carbondale including Unity Point Elementary School, Giant City School, Lewis School, Thomas Elementary School, Parrish Elementary School, and Carbondale Middle School. To select the sample for the qualitative phase, I used purposive sampling to choose eight participants from each group (ESL teachers, students, and parents) in order to collect qualitative data through in-depth interviews. This process involved choosing the participants who would provide a richness of data (Patton, 2002) [48], and it also addressed the purpose of the study, which aimed to explore the criteria used by ESL teachers, students, and parents to choose suitable and effective mobile applications for ESL instruction and to explore the barriers that ESL teachers, students, and parents perceived might influence the successful use of mobile applications to improve ESL elementary school students' language skills. As such, there was no need to generalize the findings to other populations. According to Creswell (2014) [9], purposive sampling helps the researcher select participants with particular characteristics to best answer research questions. The participants were selected based on two criteria: a) agreeing to voluntarily participate in the study by completing the consent form and b) completing and submitting the study's questionnaire.

Data gathering procedures

After using cluster sampling to select one public elementary school from 4th to 8th grade among six elementary schools in Carbondale—including Unity Point Elementary School, Giant City School, Lewis School, Thomas Elementary School, Parrish Elementary School, and Carbondale Middle School—Unity Point Elementary School was randomly chosen, a small number of ESL teachers could participate in this study, the sample included all of them. After receiving approval from the SIU IRB, I asked the public school administrations to send consent forms and cover letters to ESL teachers asking them to sign and provide their email address if they agreed to be participants.

I used purposive sampling to choose eight participants from each group (ESL teachers, students, and parents) in order to collect qualitative data through in-depth interviews during the 2016-2017 academic year. This number of participants was chosen to enrich the data. Lincoln and Guba (1985) [35] stated, "in purposeful sampling, the size of the sample is determined by informational consideration" (p. 202). Furthermore, Creswell and Clark (2011) [8] stated, "The sample size relates to the question and the type of qualitative approach used" (p. 174).

The purpose of the interviews was to ask participants about barriers they perceived might influence the successful use of mobile applications and identify the criteria they use to choose suitable and effective mobile applications to improve ESL elementary school students' language skills. Interviews took place at a place and time most convenient to the participants. Most of the student and parent participants chose their households (8 interviews) and the other 4 interviews took place in community room of Evergreen Terrace, while interview with teachers took place in their schools. Before the interview, interviewees provided demographic information. I notified the interviewees that all information they provided was for research purposes only. The primary language used in the interviews was English. The average duration of each interview was 30–40 minutes. They were recorded for accurate data transcription. I avoided guiding the interviewees toward any particular answers and encouraged them to express their opinions freely. The interviews were conducted over a two-week period.

Data Analysis Plan

Using multiple data sources in the qualitative phase (in-depth interviews) produced a large amount of raw data that would make little sense without a process of sorting, organizing, coding, and categorizing (Lichtman, 2013) [33]. This process helped me identify a set of themes that can be used to look at the data (Creswell, 2014) [9]. In the current study, I sorted, organized, and went through all qualitative data in order to categorize them according to topics and sub-topics and make a list of codes. Then, I reduced that list by grouping similar or overlapping categories together and using these categories to build up a set of themes that are used to look back at the data. Creswell (2014) [9] illustrated this point when he stated, "Qualitative researchers build their patterns, categories, and themes from the bottom up by organizing the data into increasingly more abstract units of information" (p. 186).These results and helped to bridge the gap in previous literature that only used one paradigm (e.g., Valk, Rashid, & Elder, 2010; Al Aamri, 2011; Vázquez-Cano, 2014; Shifflet &

Weilbacher, 2015; Şad & Göktaş, 2014) [67, 37, 11, 57, 10].

Instrumentation

A qualitative design was deemed an appropriate approach for this research.

In-Depth Interview

In the second phase of this research, I used a case study design consisting of in-depth interviews. Interview questions were developed based on the survey results, in light of the study questions, and were adapted from those used in Hew and Brush (2007) [20], Messinger (2012) [39], de Lourdes Andrade (2014) [12], and Alqallaf (2016). These studies pointed out barriers that might influence the successful use of educational mobile applications in the teaching and learning process in the ESL classroom and how ESL teachers, students, and parents can overcome these barriers. They also gave criteria that ESL teachers, students, and parents used to choose suitable and effective mobile applications for ESL instruction. The questions were modified to provide more information that would be more closely linked to this study's questions.

This study had mentioned barriers that ESL teachers, students, and parents perceived might influence the successful use of mobile applications to improve ESL elementary school students' language skills and the criteria that ESL teachers, students, and parents use to choose suitable and effective mobile applications for ESL instruction. I used in-depth semi-structured individual interviews in order to give ESL teachers, students, and parents room for describing their experiences in their own words. Nunan (1992) [44] stated that, "...because of its flexibility, the semi-structured interview has found favor with many researchers, particularly those working within an interpretive research tradition" (p. 9).

In order to create my interview protocol, I analyzed my research questions to break it down into simple interview questions. I also read literature related to my research topic in order to focus the questions. I created or adapted some questions from previous research. I combined the questions I created with those I adapted from related literature to create my first draft interview protocol, which I submitted to my ESL professor for a peer review. Based on this feedback, I added, deleted, and modified questions to increase the chances of collecting meaningful data.

My interview protocol for ESL teachers, parents, and students comprised four parts including an introduction and conclusion. To build rapport with participants, increase their confidence during the interview, and reduce their nervousness, I used the introduction to describe the purpose of the study and to present myself to the participants. In the second part, I asked questions about their educational and personal background to help them feel more comfortable in opening up to me. In the third part, I asked the participants several questions pertaining to my research questions. In the conclusion, I thanked the participants for taking part in the study and asked them if they wanted to add any further comments or review their answers. I kept participants' emails and contact information in order to send them a transcript of their interviews.

All interviews were conducted in English during the fall semester of the 2016-2017 academic year. The average length of each interview was expected to be about 30-40 minutes. Participants were asked to confirm their permission to be tape recorded. Then, all interviews were transcribed more or less verbatim after finishing the interviews. In order to increase the validity of interview data, I listened and transcribed the tape recordings of the interviews with an assistant repeatedly and asked participants to comment and give feedback about the interview transcripts (a member check).

Using in-depth individual interviews in qualitative studies produced a large amount of raw data that makes little sense without a process of sorting, organizing, coding, and categorizing (Lichtman, 2013) [33]. This process helps qualitative researchers identify a set of themes that can be used to look at the data.

Rigor and trustworthiness

I used several strategies to increase my study's rigor and trustworthiness. To ensure credibility, I used member checking by reviewing the transcriptions of the interviews with the participants. To ensure dependability, I described in detail the methodology, including the research site, participants, and data collection methods. Additionally, I asked an experienced researcher to review and examine the data collecting and coding process. To increase transferability, I provided very detailed descriptions of the research, such as the context in which the data were collected, the sampling method, and participants' characteristics. Lastly, to increase conformability, I undertook an audit in which I reviewed several other elements, such as notes, taped data, and interview transcripts.

For the purpose of this study, I first sought the approval of the SIUC IRB. Prior to any survey or interview, each participant signed a formal statement of consent form. For students, since they were minors, the consent form was sent to their parents or guardians. The participants' signature on the consent form indicated that they understood and agreed to participate in the study, understood that they could refuse to participate at any time, and could refuse to answer any question that they were not comfortable with. In addition to the consent form, the information provided by participants was kept strictly confidential and was only used for the research purposes. To encourage individuals to participate, I provided them with information about the purpose and potential benefits of the study.

Results

The results of the data analysis organized by each research question. The study examined criteria for choosing effective mobile applications and the barriers that could influence the successful use of mobile applications to improve ESL elementary school students' language skills. The study sought to answer the following research questions:

1. What are the barriers that ESL teachers, students, and parents perceive might influence the successful use of mobile applications to improve ESL elementary school students' language skills?

2. What criteria do ESL teachers use to choose suitable and effective mobile applications for ESL instruction?

Question 1

Research Question 1 was, "What are the barriers that ESL teachers, students, and parents perceive might influence the successful use of ESL educational mobile applications to improve ESL elementary school students' language skills?" Identifying what these groups perceive as barriers is very important for the successful integration of mobile technology in learning and teaching (Pepe, 2016) [49]. Barriers are identified in terms of three main themes: lack of mobile devices and appropriate ESL applications, lack of technical support and training, and negative attitudes and beliefs toward technology integration in the learning and teaching process.

Lack of mobile devices and appropriate ESL applications

One of the main barriers to integrating mobile applications into language teaching and learning is the high cost of such devices and inadequate applications. Some families and most school districts do not have enough money to provide each ESL student with a mobile device. For example, ESLT1 stated the following:

There is a lack of opportunities for ESL teachers to use ESL educational mobile applications in teaching English because of insufficient devices, such as smartphones, iPods, and tablets. We are organizing the school schedule in a way that allows more students to benefit from mobile devices.

Likewise, ESLP2 commented, "Some ESL classrooms could not provide the needed devices to students… I have four kids and I cannot buy a mobile device for each." Some participants also mentioned the cost of applications as a factor. ESLP4 stated that "most of the educational applications are not free; even free or lite versions are full of advertisements."

Some participants pointed out that most educational mobile applications have several shortcomings. ESLP3 stated, "I used several mobile applications to help my daughter develop her English language. She learnt a lot of vocabulary in a short time, but she could not use [the words] in full sentences." He added, "They present words in isolation without context." An ESL student said, "I have many apps on my iPad; they are only about colors, numbers, and food that I already knew." Moreover, some participants stated that most such applications focus on teaching vocabulary and pronunciation over other language skills. ESLP6 said, "I do not know of any application to learn reading or writing."

Furthermore, some ESL teacher participants stated that most ESL educational mobile applications do not provide interactive features for ESL learners and focus on the cognitive domain over other domains. ESLT5 stated, "Most of the tasks focus on memorization and recall and do not support problem solving and higher thinking skills."

Lack of technical support and professional training

In addition to insufficient funding and technology, some teachers perceived a lack of technical support to be a major barrier to integrating mobile technology into the ESL teaching and learning process. ESLT8 stated, "In most schools, particularly with low budgets, there is no technician. Even if there are technicians, they take a long time to respond because they are overwhelmed by administrators' and teachers' requests." Likewise, ESLT3 commented, "there is no immediate technical support…these technical teams could not respond swiftly or adequately." ESL students also pointed out that they frequently encountered technical problems with mobile devices. ESLS1 stated, "Before I completed the task, the iPad was frozen […] It makes me feel disappointed."

Furthermore, teachers stated that there are few professional training opportunities for integrating technology in ESL classrooms. They also mentioned some problems related to classroom management. ESLT3 illustrated this point when she stated, "I waste much time getting devices and applications ready for use." ESLT1 commented, "I have some discipline problems […] it is difficult to keep students on task while using mobile devices." Both teachers and parents reported difficulty choosing appropriate ESL applications that accommodate students' level, needs, and interests. ESLT2 stated, "We need effective training to overcome classroom management and discipline problems […] we need professional training that helps us select applications that address students' needs and interests." ESLP5 likewise commented that "ESL parents need training workshops to guide them in using different devices and applications."

Attitudes and Beliefs

Most participants showed positive attitudes toward using educational mobile applications in teaching and learning English as a second language. They also believed in the benefits of using such applications to improving the language skills of ESL elementary school students. However, some participants expressed concerns about integrating these applications into the classroom. Some parents and students stated that using mobile devices could be harmful to children. For instance, ESLP4 said, "I know that mobile applications are useful for learning English, but I think their harmful effect exceeds their benefits […] Mobile devices cause cancer and such health risks." ESLP2 commented, "I don't like the idea of using educational mobile applications in language classrooms…using mobile devices might increase the danger of engaging in inappropriate behaviors, such as accessing inappropriate sites, interacting with strangers, sending or receiving private pictures." Likewise, ESLS1 commented that "I do not feel comfortable when I use mobile devices because my mom told me they are harmful to children."

Furthermore, some ESL teachers showed a negative attitude toward using educational mobile applications in teaching and learning. ESLT2 said, "I think children learn more when they interact with each other… Although I had seen the power and value of mobile applications in different area of our lives, I am unconvinced that they could help in language leaning and teaching." ESLT7 also commented, "Using educational mobile applications in ESL classrooms wastes too much time." She also stated, "Offline applications do not support collaboration in the ESL classroom and using online applications might distract students' attention and increase the risks of technology in the classroom."

Based on this review of the data collected, the main barriers to using educational mobile applications in teaching and learning English were related to three areas: availability of technology and technical support, professional training, and the attitudes

and beliefs about integrating technology into the teaching and learning process. Some participants provided suggestions to overcome these barriers, including the following:

- Negotiate agreements with companies to get discounted prices on mobile devices.
- Enroll in customer service plans that provide unlimited technical support.
- Organize professional training workshops or programs to help ESL teachers and parents effectively integrate mobile technology into the teaching and learning process and to solve simple technical problems.
- Give ESL teachers opportunities to talk about their innovative strategies and successful experiences using educational mobile applications to teach ESL children.
- Raise awareness among teachers, parents, and students about the risks of using mobile technology and strategies to avoid these risks.

Question 2

Research Question 5 was, "What criteria do ESL teachers use to choose suitable and effective mobile applications for ESL instruction?" Understanding the nature of and selecting appropriate applications are important factors for the successful use of mobile devices in the ESL classroom. Therefore, in all interviews, I asked ESL teachers, students, and parents about the criteria they took into account for choosing suitable and effective ESL educational mobile applications for English language teaching and learning. The qualitative data analysis revealed that some students, parents, and teachers do not take into account any criteria when choosing educational mobile applications. As ESLP1 stated, "I did not think about that before. I just search in the App Store and pick any of them". However, the results identified four major categories when choosing these applications:

- User feedback and reputation
- Content and focus
- Theoretical and pedagogical features
- Technological features

User feedback and reputation

ESL parents and students focused on user feedback and reputation as criteria for choosing ESL mobile applications. ESLS3 stated, "I choose applications that got "4 or 5 stars." Likewise, ESLP 5 commented, "I read users' review and choose applications that gained positive feedback." ESL P7 also stated, "When there is no detailed description of the application, I read users' feedback. I also consider the download counts […] I do not download applications that don't have many users."

Content and Focus

ESL students, parents, and teachers pointed out content and focus as important criteria for selecting ESL educational mobile applications. Content relates to the materials or topics presented in the applications, while focus relates to the language skills that the applications address. ESLP7 stated, "Before I installed any ESL applications, I read the description provided by the developer company to know the skills and topics that the application focused on […] then I see if these topics and skills fit my daughter's level." ESL students, parents, and teachers emphasized the importance of learner needs and interests when selecting applications. ESLS8 emphasized this point when she stated, "I feel I am not good in pronunciation, so I downloaded applications that teach pronunciation more than other skills." Similarly, ESLT1 stated the following:

I believe that using mobile applications in language instruction supports individual learning. Accordingly, I select applications that individually meet the needs of each student […] for instance, if the student has a weakness in writing, I installed an application that focused on writing and so on.

In addition, some participants indicated the content size of mobile applications as a criterion for selecting them. For instance, ESLP6 stated, "I select applications that provide much information and many activities and tasks." In contrast, ESLP4 stated, "My two kids usually prefer games that add little, if any, to their learning, such as racing games, so it's extremely difficult to have them engaged in such learning applications, so I choose applications that contain tiny content."

Another essential content-related criterion the participants mentioned was related to ethical issues. ESLT5 illustrated this point when she stated, "I try to eliminate morally biased, violent, and inappropriate content." ESLP2 likewise commented, "I avoid applications that encourage violence or bad behaviors."

Theoretical and pedagogical features

This criterion was mostly emphasized by teacher participants. Theoretical and pedagogical features of educational mobile applications relate to learning theories and practices that are applied in educational mobile applications, such as collaborative learning, behaviorist learning, constructivist learning, and problem-based learning. For instance, some applications encourage behaviorist learning by asking for a response from the learner and then providing reinforcement through immediate positive or negative feedback. In contrast, some applications encourage constructivist learning by providing learners with tools and asking them to construct new ideas or constructs based on their prior knowledge.

This criterion was associated with individuals' beliefs; i.e., individuals choose educational mobile applications based on their beliefs and views about learning and teaching. For instance, ESLT3 stated, "I avoid applications that only focus on drills and memorization." Likewise, ESLT8 commented, "I select applications that encourage collaboration among learners and those that give learners an opportunity to communicate and share information with each other." She added, "I like applications that support individualization by allowing learners to create and store their own content based on their needs."

Technological Features

The fourth criterion for choosing ESL educational mobile applications was related to the technological features of the applications, such as screen design, voice synthesizing, speed, clarity, consistency, and ease of use. Participants mentioned different aspects related to this criterion including the following:

- Large text size

- Clear screen
- Good sound quality
- Bright colors
- Easy to install, access, and use
- Fast loading processing (high performance)
- Clear instructions

In addition to these characteristics, ESLP4 stated, "I take into account security aspects; some applications ask access to private information on your device… You should be aware when using some applications." Likewise, ESLP3 commented, "Applications should adapt to learners' preferences; for example, they should give users the ability to control font, colors, and sizes." She also suggested that "applications with great content should have a search tool to find any information easily."

Participants identified four main criteria for choosing ESL educational mobile applications: user feedback and reputation, content and focus, theoretical and pedagogical features, and technological features. Taking these criteria into account can help ESL learners, parents, and teachers choose applications appropriate to a learner's level that address their needs.

Discussion and conclusions

This chapter discusses the findings of the study and how the results relate to the existing literature. Afterward, it provides limitations, recommendations, suggestions for future research, and implications of the findings. This study examined criteria for choosing effective mobile applications and the barriers that could influence the successful use of mobile applications to improve ESL elementary school students' language skills. Both quantitative and qualitative techniques were used for data collection to answer the following research questions:

1. What are the barriers that ESL teachers, students, and parents perceive might influence the successful use of mobile applications to improve ESL elementary school students' language skills?
2. What criteria do ESL teachers use to choose suitable and effective mobile applications for ESL instruction?

To answer these research questions, qualitative results are discussed below.

Discussion of the Findings

Barriers to Using Educational Mobile Applications

In the in-depth interviews, the eight ESL students, eight ESL parents, and eight ESL teachers identified several barriers that they perceived might influence the successful use of educational mobile applications for English language learning. Identifying what these groups perceive as barriers is vital to the successful integration of mobile technology in learning and teaching (Pepe, 2016) [49]. Barriers were identified in terms of three main themes: lack of mobile devices and appropriate ESL applications, lack of technical support and training, and negative attitudes and beliefs toward technology integration in the learning and teaching process.

Lack of mobile devices and appropriate ESL applications. One of the main barriers to integrating mobile applications into language teaching and learning was the high cost of such devices and inadequate applications. Some families and most school districts do not have enough money to provide each ESL student with a mobile device or to buy applications that meet each student's needs. This result was consistent with several studies in the field of mobile learning, such as Aubusson, Schuck, and Burden (2009), Merç (2015) [37], Shifflet and Weilbacher (2015) [57], Kim and Kwon (2012) [27], and Vázquez-Cano (2012), which suggested that the lack of technological tools or software was the main barrier for integration of technology in education. According to Yuksel and Kavanoz (2011) [73], the availability of and access to technological tools played a significant role in shaping individual perceptions and attitudes toward integrating technology in the learning and teaching process. In other words, when technology was available, teachers and students tended to have more positive perceptions of technology integration.

In addition, some participants felt that most educational mobile applications had several shortcomings. These included 1) segregation of language skills, which agreed with what Kim and Kwon (2012) [27] stated, "skills were not integrated actively to develop comprehensive speaking ability such as reading and speaking or listening and speaking" (p. 50); 2) focusing on memorization and drills rather than problem solving and higher thinking skills; and 3) the absence of context, particularly in vocabulary and grammar activities. These results supported Kim and Kwon (2012) [27], who stated that most educational language applications only provided drill and practice, such as listening and repeating, vocabulary matching, and voice recording.

Lack of technical support and professional training: In addition to insufficient funding and technology, some teachers perceived a lack of technical support and professional training to be major barriers to integrating mobile technology into the ESL teaching and learning process. Teachers suggested that a lack of professional training negatively influenced their ability to support students' personalized learning, choose appropriate applications, manage class time, and deal with discipline problems. These results were consistent with Merç (2015) [37]; Aubusson, Schuck, and Burden (2009); Chaklikova and Karabayeva (2015) [57]; Yüksel and Kavanoz (2011) [73]; Shifflet and Weilbacher (2015) [57]; Pepe (2016) [49]; and Vázquez-Cano (2012). According to Aubusson, Schuck, and Burden (2009), teachers' perceptions of technology integration were inconsistent and changed as their knowledge and experience increased through professional training and authentic use of technology in the classroom.

However, in order to benefit teachers, professional training programs must address teachers' needs and be accompanied by further support. Pepe (2016) [49] illustrated this point:

Unless teacher training models are designed to meet the specific needs of classroom teachers, and to provide systematic follow-up and support, teachers' attitudes and perceptions regarding not only the use of technology in the classroom but also the training program itself will be negative. (p. 7)

In order to understand teachers' needs, it is necessary to identify their perceptions, attitudes, and feelings toward technology integration and to identify the obstacles they perceive to hinder technology integration. Pepe (2016) [49]

stated, "Recognition of teachers' perceptions of educational technology is necessary for understanding their willingness or reluctance to integrate technology into instructional practices. Obstacles and negative attitudes could only be overcome when teachers were asked about their technology needs" (p. 22). In addition to continuous training, peer and administrator support maximizes the opportunities for successful technology integration and help teachers benefit from each other's experiences.

Attitudes and beliefs: Most participants showed positive attitudes toward using educational mobile applications in teaching and learning English. They also believed in the benefits of using such applications to improve the language skills of ESL elementary school students. However, some participants showed negative beliefs and attitudes toward integrating these applications into the classroom. Some parents and students stated that they felt reluctant about using these applications because of their potentially harmful effects, such as health risks, accessing inappropriate sites, interacting with strangers, and sending or receiving private pictures. Some also believed that using applications in the language classroom wasted time and hindered interaction between students. Some ESL teachers even considered such applications worthless in language teaching and learning.

These results were consistent with Valk *et al*. (2010) [67], Vázquez-Cano (2012), and Pepe (2016) [49]. According to Merç (2015) [37], some teachers saw using technology in the educational process as a waste of time because it took too much time for teachers to prepare materials and think about strategies for integration. It also wasted teaching time because of technical problems and students' and teachers' lack of knowledge about technological features and tools. Shifflet and Weilbacher (2015) [57] stated that some teachers had negative attitudes toward technology integration because they did not want to change their classroom strategies and practices. However, Pepe (2016) [49] stated that negative beliefs and barriers could be overcome through continuous professional training, authentic use of technology, peer and administrator support, and discussion of the issues related to technology integration.

Criteria for choosing appropriate educational mobile applications

Some students, parents, and teachers did not consider any criteria when choosing educational mobile applications. According to Lee and Cherner (2015) [31], the lack of criteria for choosing mobile applications does not support the learning process and could negatively influence learner motivation and self-efficacy. For example, overly easy materials caused boredom or made learners feel less competent. On the other hand, overly difficult materials or tasks might overwhelm or frustrate learners. The results of the present study identified four major categories when choosing these applications:

- User feedback and reputation
- Content and focus
- Theoretical and pedagogical features
- Technological features

User feedback and reputation: ESL parents and students focused on user feedback and reputation as criteria for choosing ESL mobile applications. User reviews are considered the bare minimum for choosing applications but are sometimes a good indicator of the effectiveness of applications (Guo, 2013) [18]. However, students, teachers, and parents should take a deeper look at other aspects, such as content, pedagogical features, and technological features. This result was supported by Guo (2013) [18], who suggested that many language learners take into account average user rating, number of users, and user comments as basic criteria for choosing appropriate educational mobile applications for English language learning.

Content and focus: ESL students, parents, and teachers also pointed out content and focus as important criteria for selecting educational mobile applications. Content relates to the materials or topics presented in the applications, while focus relates to the language skills that the applications address. Participants considered different aspects of content, such as learners' grade level, interest, and needs. In addition, they took into account content size and ethical considerations. In regards to learner level, Lee and Cherner (2015) [31] stated that materials or tasks presented via mobile applications should match the zone of proximal development (ZPD) of learners. Vygotsky's ZPD is related to the difference between what the individual can do independently and what he or she can do with support and help. In other words, tasks should be neither too easy nor too difficult, so the learner can do them independently or with assistance. Teacher, parent, or a more capable peer can offer the assistance. In mobile applications, the assistance or scaffolding tools include videos, pictures, graphic organizers, model examples, or lists of difficult vocabulary.

In the second language acquisition field, Krashen (1981) used the term "comprehensible input" to describe the appropriate level of difficulty for language input for successful language learning. According to Krashen, the comprehensible input hypothesis (or i+1) relates to language input that is slightly beyond a learner's current level. When language input is under or exactly the same as the learner's level, he or she feels bored and less competent; when language input is extremely difficult, the learner feels discouraged and frustrated, making learner level an important criterion for choosing educational mobile applications for successful language learning.

In addition to learner level, the results showed that some participants took into account learner interest as a criterion for choosing educational mobile applications; i.e., it is important to find out what topics, skills, or tasks that the learner likes or cares about. According to Lee and Cherner (2015) [31], effective educational mobile applications provide a variety of topics and tasks and allow learners to choose what they like. According to Guo (2013) [18], meeting learner level and interest improves motivation and maximizes engagement.

Another essential content-related criterion the participants mentioned was related to ethical considerations. Some participants stated that they avoided applications that encouraged violence, bias, bad behavior, and hate. This result was consistent with Lee and Kim (2015) [27], who stated, "An app should not contain morally biased or violent and lascivious contents, because in some cases it could be used as

an alternate form of a textbook" (p. 439). According to Norton and Toohy (2014), when language practices are not ethically appropriate—for example, being violent, racist, or elitist—learners may not invest in the target language and lose the desire to learn or practice that language. Ethical considerations are thus an important criterion for choosing effective applications.

Theoretical and pedagogical features: Teacher participants mostly emphasized this criterion. Theoretical and pedagogical features of educational mobile applications relate to learning theories and practices that are applied in these applications, such as collaborative, behaviorist, constructivist, and problem-based learning. For instance, some applications encourage behaviorist learning by asking for a response from the learner and then providing reinforcement through immediate positive or negative feedback. In contrast, some applications encourage constructivist learning by providing learners with tools and asking them to construct new ideas or constructs based on their prior knowledge.

This criterion was associated with individuals' beliefs; i.e., individuals chose educational mobile applications based on their beliefs and views about learning and teaching. For instance, teachers who believed in the constructivist approach stated that they tried to choose applications that encouraged collaboration and gave learners opportunities to communicate and share information with each other or applications that supported personalized learning and allowed learners to create their own content or choose content based on their needs and interest. Some avoided applications that supported behaviorist views of learning, such as drills and repetition. This result was consistent with Guo (2013) [18], who investigated the pedagogic features of mobile applications for learning English, particularly speaking applications. According to Guo (2013) [18], theoretical and pedagogic features of mobile applications consist of three elements: learning theories and paradigms (e.g., behaviorist, cognitivist, constructivist, collaborative, and situated learning), instructional activities (which refer to teaching related activities, e.g., grading, evaluating, and tutorials), and individual exercises (e.g., quizzes, practice, and games).

Technological features: The fourth criterion for choosing ESL educational mobile applications was related to the technological features of the applications. Features related to this criterion included the following: large text size, clear screen, good sound quality, bright colors, easy to install, access, fast loading processing (high performance), and clear instructions. According to Lee and Cherner (2015) [31], technical features are considered a critical factor in successful technology integration. When technical components are well organized in a way that increases the quality of the application, they maximize learners' motivation, engagement, and interaction with the application. However, Lee and Kim (2013) [26] stated, "technical aspects of criteria are only the bare minimum; practitioners need to take a more focused look at the educational benefits for their students" (p. 445); i.e., they should look at the application comprehensively and take into account other criteria related to pedagogical theories. Taking comprehensive criteria into account can help ESL learners, parents, and teachers choose applications appropriate to the learners' level and address their needs.

Implications and Recommendations

This study contributes to the integration of technology in the teaching and learning process of ESL elementary school students. Understanding teacher, student, and parent perceptions, beliefs, and concerns helps address their individual needs. In addition, identifying and overcoming the barriers that hinder educational mobile applications improve learner and teacher motivation and enhance their attitudes toward technology integration. According to Pepe (2016) [49], positive changes in teacher, student, and parent perceptions and motivation lead to successful technology integration and enhance the teaching and learning process.

This study also identified the criteria that teachers, students, and parents took into account when choosing educational applications. Identifying these criteria may provide a framework for evaluating and analyzing educational mobile applications, particularly those used for learning English. In addition, these criteria could be used to help teachers choose appropriate educational mobile applications to improve their teaching practices and performance. According to Lee and Kim (2015), decision makers should systematically consider specific criteria for assessing educational mobile applications and reflect upon their educational value before buying them. These criteria may also be indicators for the designers of educational applications.

Understanding teacher, student, and parent perceptions and concerns may contribute to promoting professional training programs and workshops related to technology integration in language learning and teaching. According to Pepe (2016) [49], professional development and training programs require understanding individual needs and concerns. As she stated, "Examinations of the teachers' perceptions are relevant to technology integration because discovering teachers' needs relative to technology gives them a line of communication that helps schools improve staff development procedures" (p. 10).

Addressing parents' perceptions in addition to those of teachers and students may encourage meaningful collaboration between them to achieve successful language learning and teaching. It also encourages parents' involvement in the language learning of their children. According to Chaudhry, Khaliq, Agha, and Hassan (2015), involving parents in education plays a significant role in student success and contributes to bridging the gap between home and school. In addition, it improves the relationship between parents, children, and teachers and helps parents encourage positive attitudes toward the teaching and learning process.

Finally, this study provides recommendations that may help overcome the obstacles to technology integration in the language learning and teaching process. These recommendations were suggested by the participants and related to three main areas: availability of technology and technical support, professional training, and attitudes and beliefs. To overcome the lack of mobile technology and technical support, schools should negotiate agreements with companies to get discounted prices on mobile devices and applications and to enroll in customer service plans that provide unlimited technical support. In respect to professional

training, continuous professional training for technology integration should be offered. It was also suggested that professional training programs be designed to meet teachers' needs and be accompanied with further support. According to Pepe (2016) [49], continuous professional training helps teachers increase their knowledge and self-efficacy using technology. As a result, they develop positive attitudes and beliefs about technology integration. Furthermore, teachers should be given more opportunities to talk about their innovative strategies and successful experiences using educational mobile applications to teach ESL children and raise awareness among teachers, parents, and students about the risks of using such technology and strategies to avoid those risks.

Conclusions

The purpose of this qualitative study was to determine the criteria participants used to choose effective applications for to learn and teach English. Although teachers, students, and parents reported positive perceptions and beliefs toward educational mobile applications, they identified some obstacles and concerns that could hinder their effective use in language learning and teaching. These issues included a lack of mobile devices and effective applications, a lack of technical support, inadequate professional development, and individual negative attitudes and beliefs. Some teachers and parents suggested recommendations to overcome these obstacles, such as negotiating agreements with companies for more affordable mobile devices and applications, enrolling in customer service plans with unlimited technical support, providing continuous professional training that meets teachers' needs along with follow-up support, and giving teachers, students, and parents opportunities to talk about their experiences using mobile applications in English language learning and teaching through workshops and lectures.

Finally, teachers, students, and parents identified some criteria for choosing educational mobile applications. These criteria were organized under four main themes: user feedback and reputation, content and focus, theoretical and pedagogical features, and technological features. User feedback and reputation were related to the number of users, user ratings, and user comments. Content and focus were related to the extent to which the content of the application considered learner needs, level, and interest and took into account the integration of language skills. Theoretical and pedagogical features were related to learning theories and practices applied in these applications, such as collaborative learning, behaviorist learning, and constructivist learning. In other words, teachers tend to choose applications that support their views and beliefs about the learning and teaching process. The last aspect concerned technological features, such as screen design, voice synthesizing, speed, clarity, consistency, and ease of use.

Identifying these criteria could provide a framework for evaluating and analyzing educational mobile applications, especially those used for English language learning. Furthermore, these criteria could help teachers choose appropriate applications to improve their teaching practices and performance. Additionally, the criteria could help decision makers assess applications and reflect upon their educational value. They may also be used to inform the design of these applications.

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